Technical Report of Project *FPA/INT/513*

LAND RESOURCES FOR POPULATIONS OF THE FUTURE

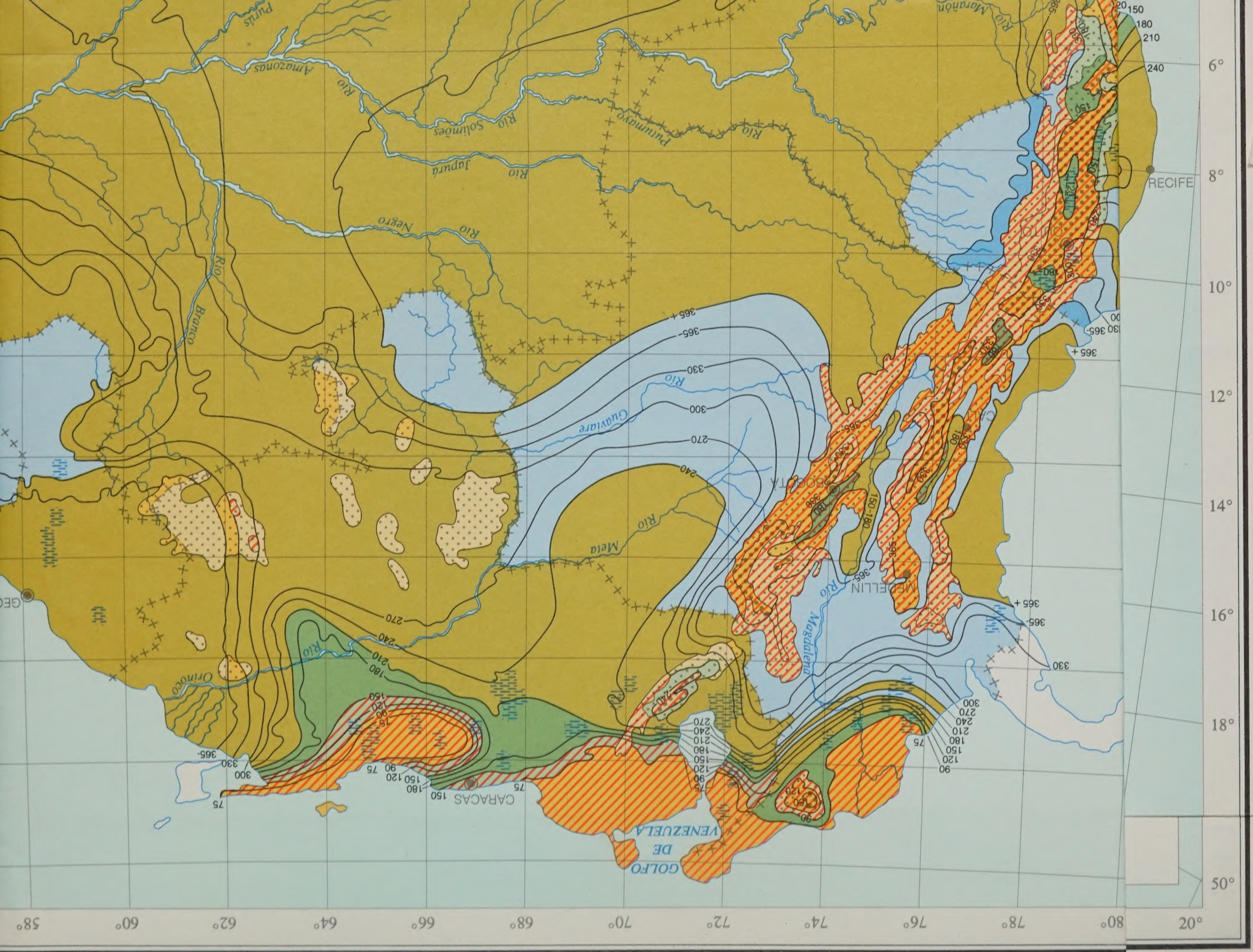
338.191724
P847

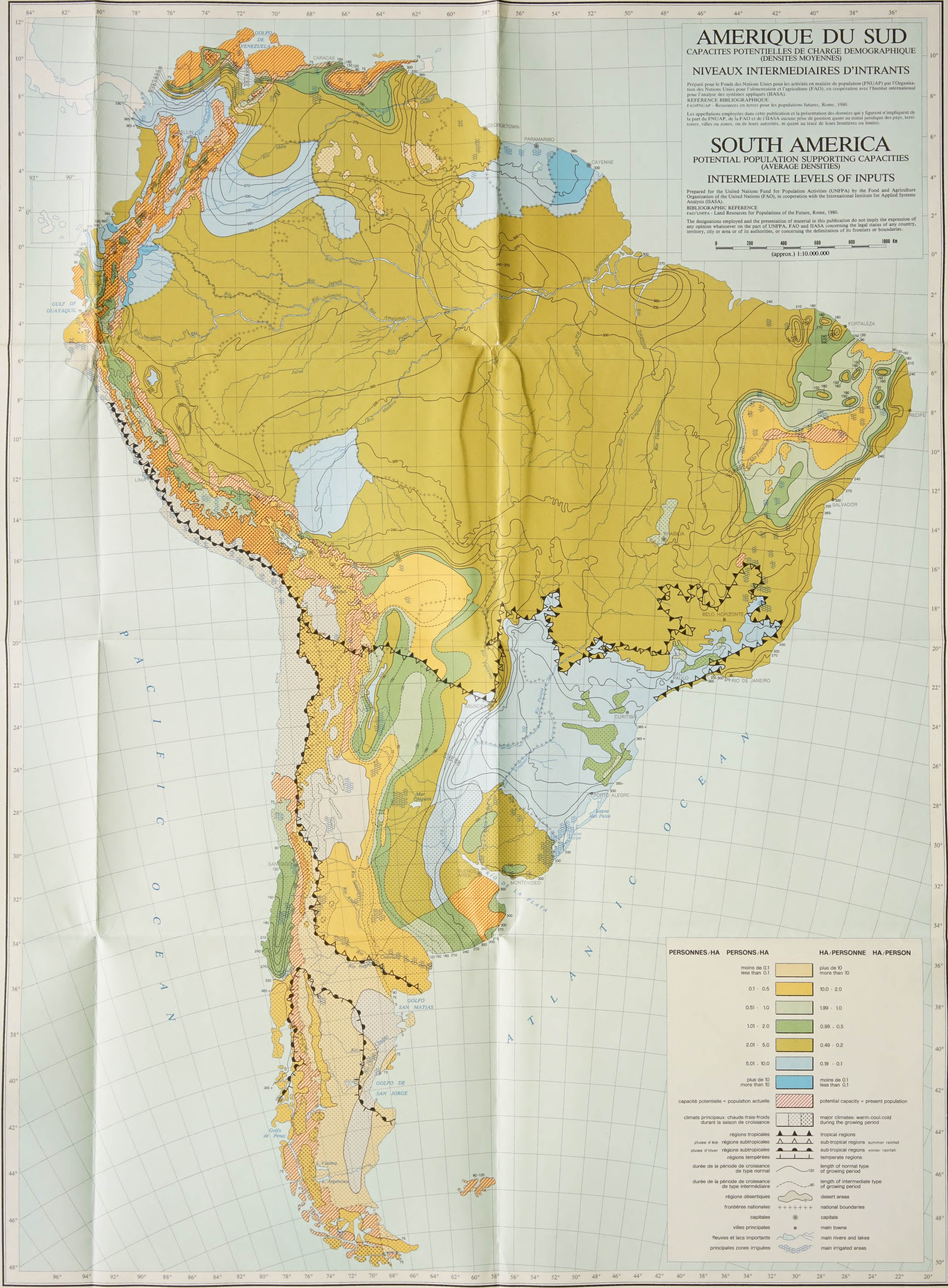
POTENTIAL POPULATION SUPPORTING CAPACITIES OF LANDS IN THE DEVELOPING WORLD

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

UNITED NATIONS FUND FOR POPULATION ACTIVITIES

INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS


GOLFO DE VENEZUELA
CARACAS
MEDELLIN
BOGOTA
RECIFE
Rio Orinoco
Rio Branco
Rio Negro
Rio Amazonas
Purús
Rio Japurá
Rio Solimões
Rio Putumayo
Rio Marañón
Rio Meta
Guaviare
Rio Magdalena
58°
60°
62°
64°
66°
68°
70°
72°
74°
76°
78°
80°
20°
6°
8°
10°
12°
14°
16°
18°
50°
75
90
120
150
180
210
240
270
300
330
365
365 +
150-180



AMERIQUE DU SUD

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE (DENSITES MOYENNES)

NIVEAUX INTERMEDIAIRES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

SOUTH AMERICA

POTENTIAL POPULATION SUPPORTING CAPACITIES (AVERAGE DENSITIES)

INTERMEDIATE LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

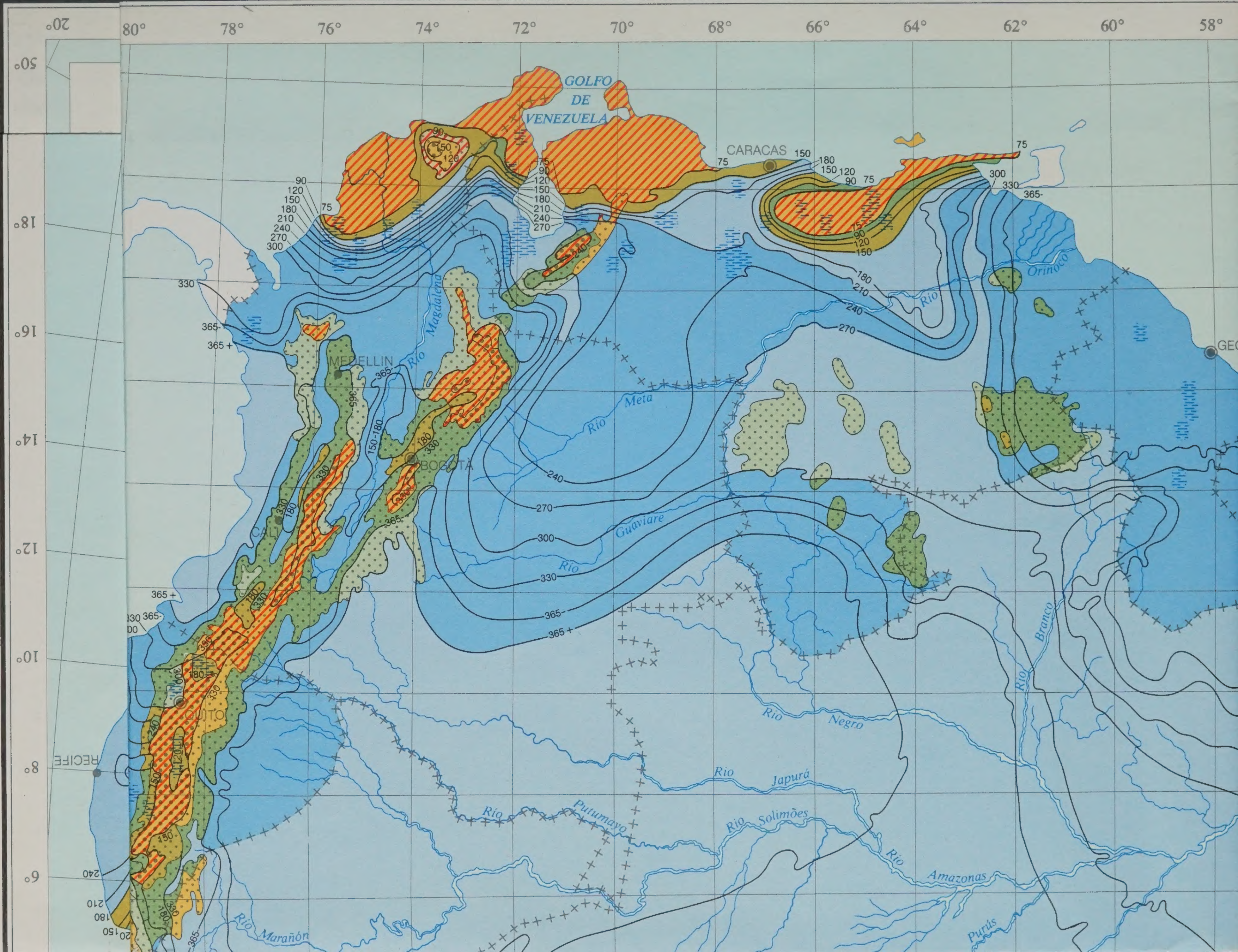
0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

PERSONNES/HA	PERSONS/HA		HA/PERSONNE	HA/PERSON
moins de 0.1	less than 0.1	🟨	plus de 10	more than 10
0.1 - 0.5		🟨	10.0 - 2.0	
0.51 - 1.0		🟩	1.99 - 1.0	
1.01 - 2.0		🟩	0.99 - 0.5	
2.01 - 5.0		🟨	0.49 - 0.2	
5.01 - 10.0		🟦	0.19 - 0.1	
plus de 10	more than 10	🟦	moins de 0.1	less than 0.1
capacité potentielle < population actuelle		▨	potential capacity < present population	
climats principaux: chauds/frais/froids durant la saison de croissance			major climates: warm/cool/cold during the growing period	
régions tropicales		▲	tropical regions	
pluies d'été régions subtropicales		△	sub-tropical regions summer rainfall	
pluies d'hiver régions subtropicales		●	sub-tropical regions winter rainfall	
régions tempérées		┴	temperate regions	
durée de la période de croissance de type normal		120	length of normal type of growing period	
durée de la période de croissance de type intermédiaire		90	length of intermediate type of growing period	
régions désertiques		0	desert areas	
frontières nationales		+++++++	national boundaries	
capitales		◉	capitals	
villes principales		●	main towns	
fleuves et lacs importants			main rivers and lakes	
principales zones irriguées			main irrigated areas	

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy


80°
78°
76°
74°
72°
70°
68°
66°
64°
62°
60°
58°
20°
50°
18°
16°
14°
12°
10°
8°
6°
GOLFO DE VENEZUELA
CARACAS
GEO
MEDELLIN
BOGOTÁ
CALI
QUITO
RECIFE
Rio Orinoco
Rio Magdalena
Rio Meta
Rio Guaviare
Rio Branco
Rio Negro
Rio Japurá
Rio Putumayo
Rio Solimões
Rio Amazonas
Rio Marañón
Purús
75
90
120
150
180
210
240
270
300
330
365-
365 +
150-180

AMERIQUE DU SUD

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE (DENSITES MOYENNES)

NIVEAUX ELEVES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

SOUTH AMERICA

POTENTIAL POPULATION SUPPORTING CAPACITIES (AVERAGE DENSITIES)

HIGH LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

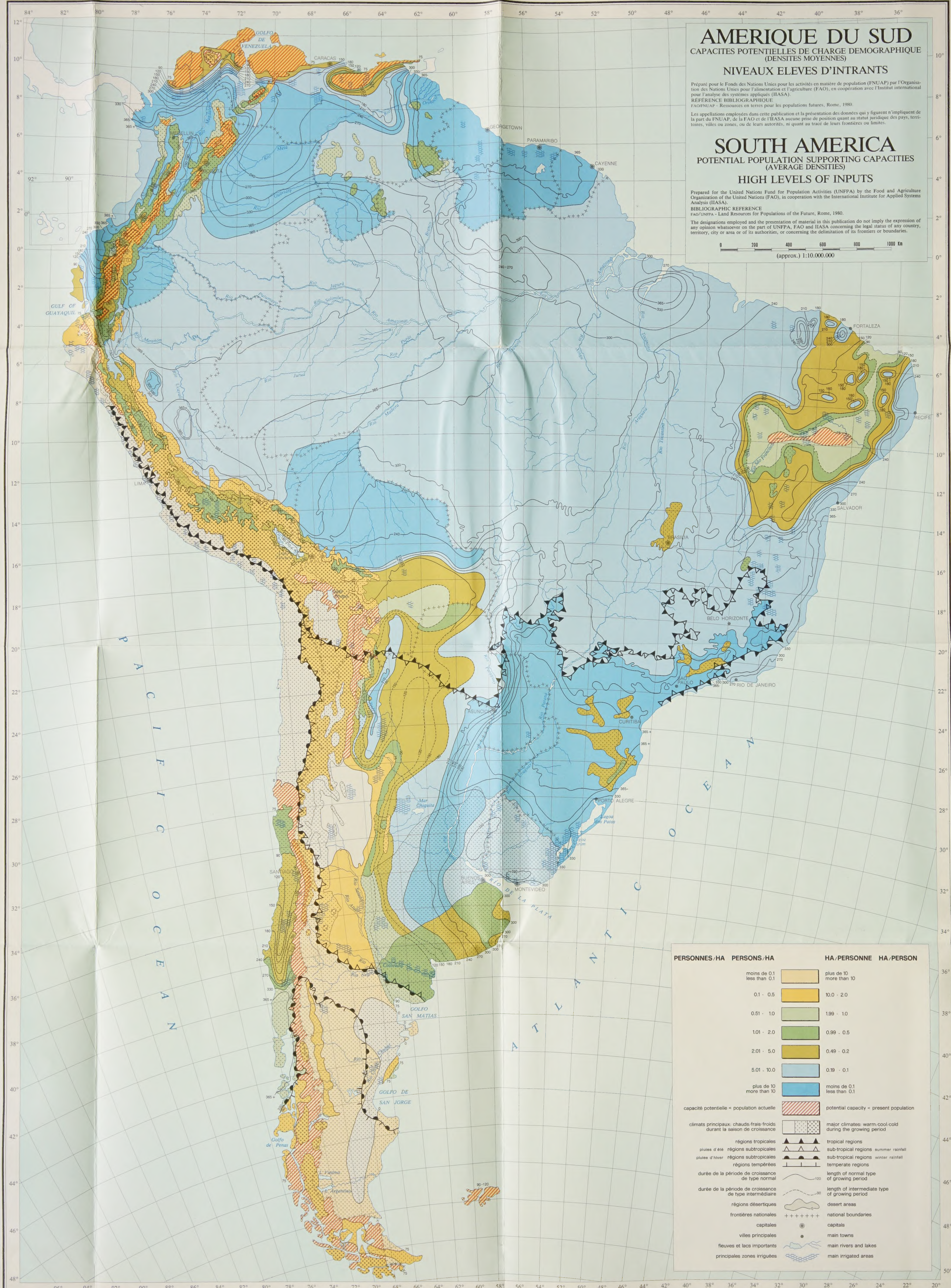
BIBLIOGRAPHIC REFERENCE

FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0　200　400　600　800　1000 Km

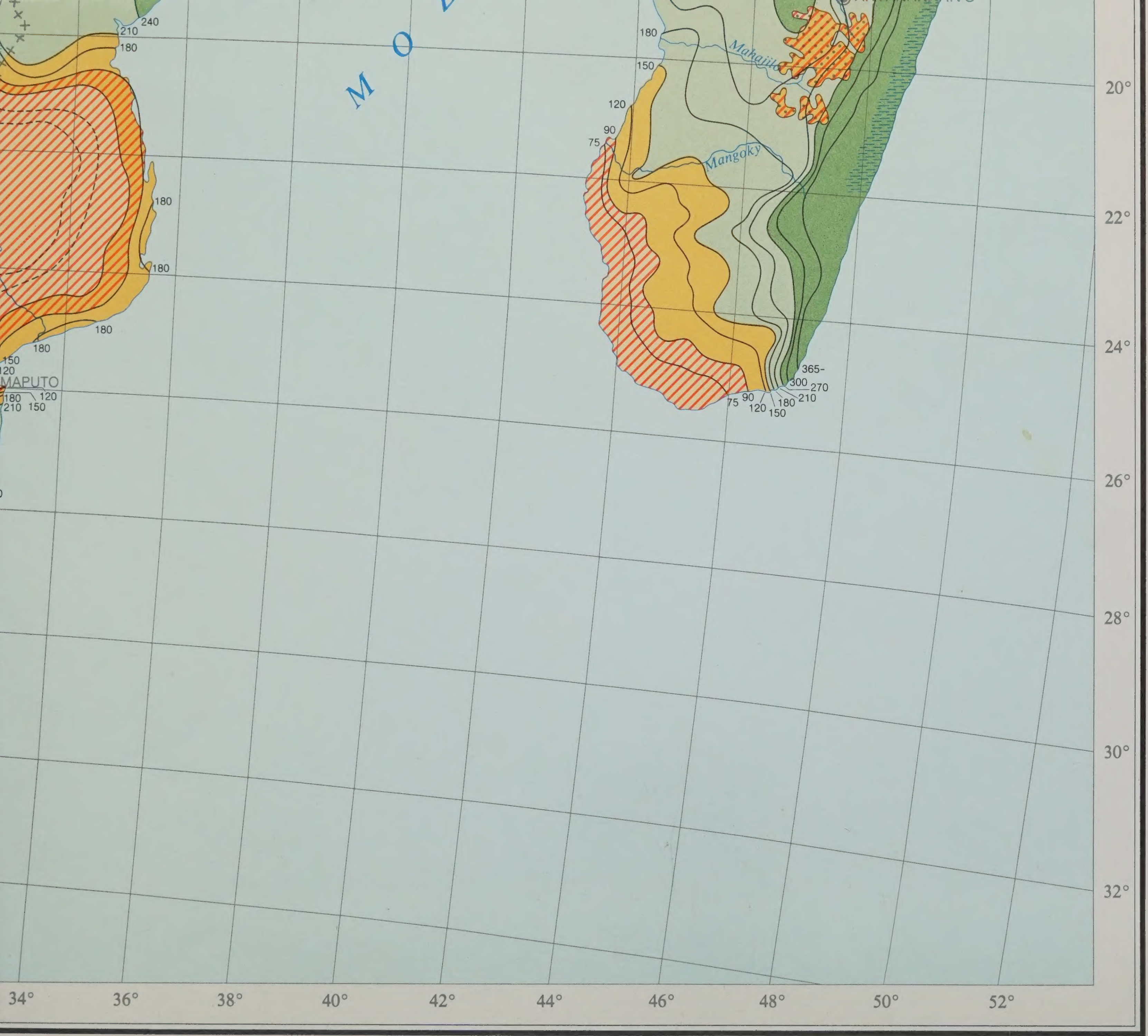
(approx.) 1:10.000.000

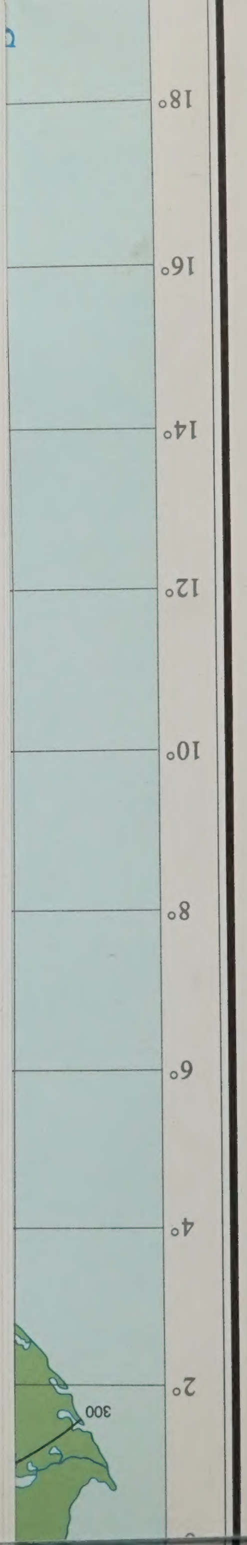


PERSONNES/HA　PERSONS/HA		HA/PERSONNE　HA/PERSON
moins de 0.1 less than 0.1	▭	plus de 10 more than 10
0.1 - 0.5	▭	10.0 - 2.0
0.51 - 1.0	▭	1.99 - 1.0
1.01 - 2.0	▭	0.99 - 0.5
2.01 - 5.0	▭	0.49 - 0.2
5.01 - 10.0	▭	0.19 - 0.1
plus de 10 more than 10	▭	moins de 0.1 less than 0.1
capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	▭ ▒ ▓	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été　régions subtropicales	△ △ △	sub-tropical regions　summer rainfall
pluies d'hiver　régions subtropicales	● ● ●	sub-tropical regions　winter rainfall
régions tempérées	┴ ┴ ┴	temperate regions
durée de la période de croissance de type normal	~ 120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	- - 90	length of intermediate type of growing period
régions désertiques	0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	~	main rivers and lakes
principales zones irriguées	≡	main irrigated areas

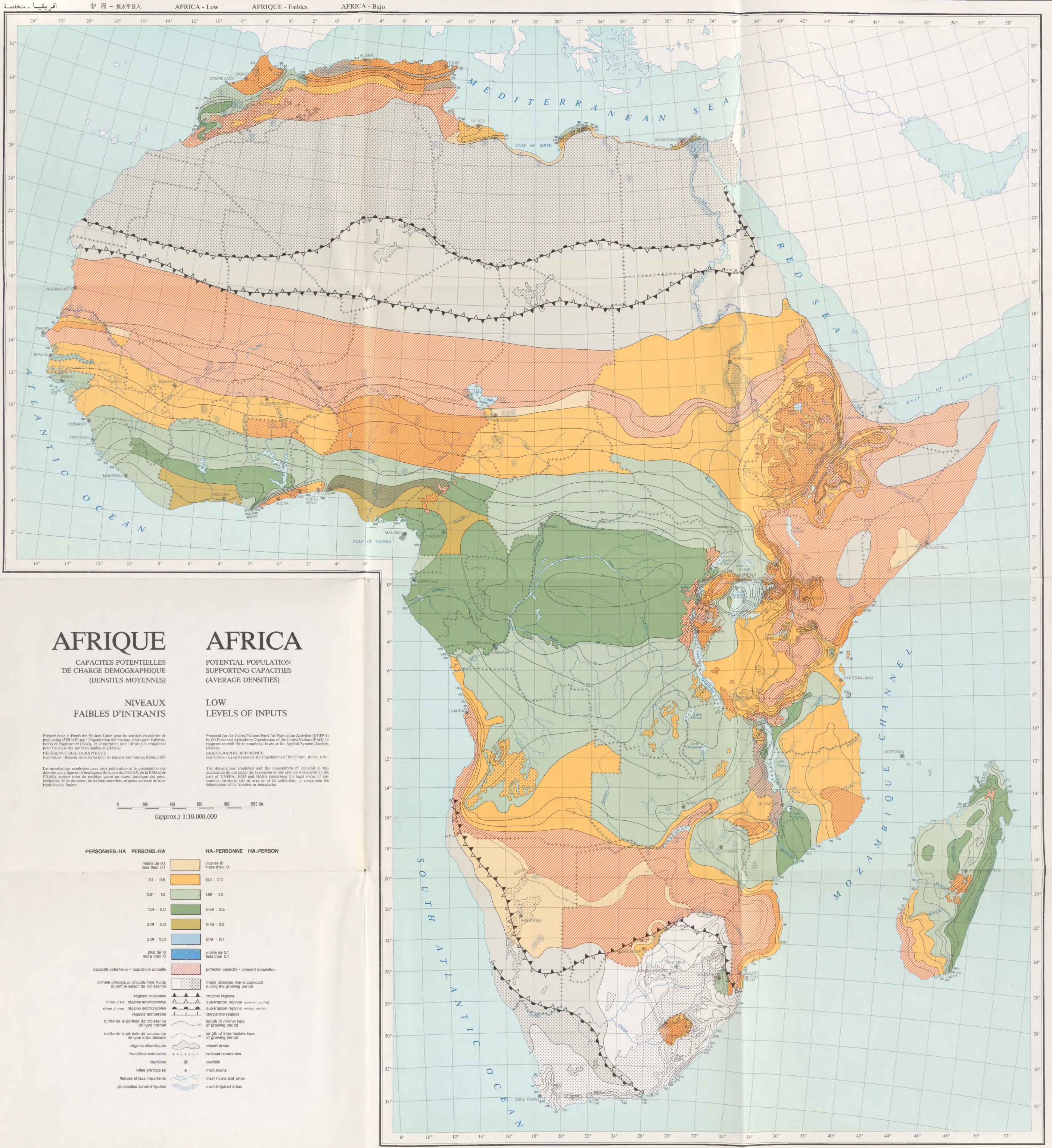
© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy





Cartography and printing: Stab. L. Salomone, Rome, Italy



AFRIQUE

CAPACITES POTENTIELLES
DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX
FAIBLES D'INTRANTS

AFRICA

POTENTIAL POPULATION
SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

LOW
LEVELS OF INPUTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

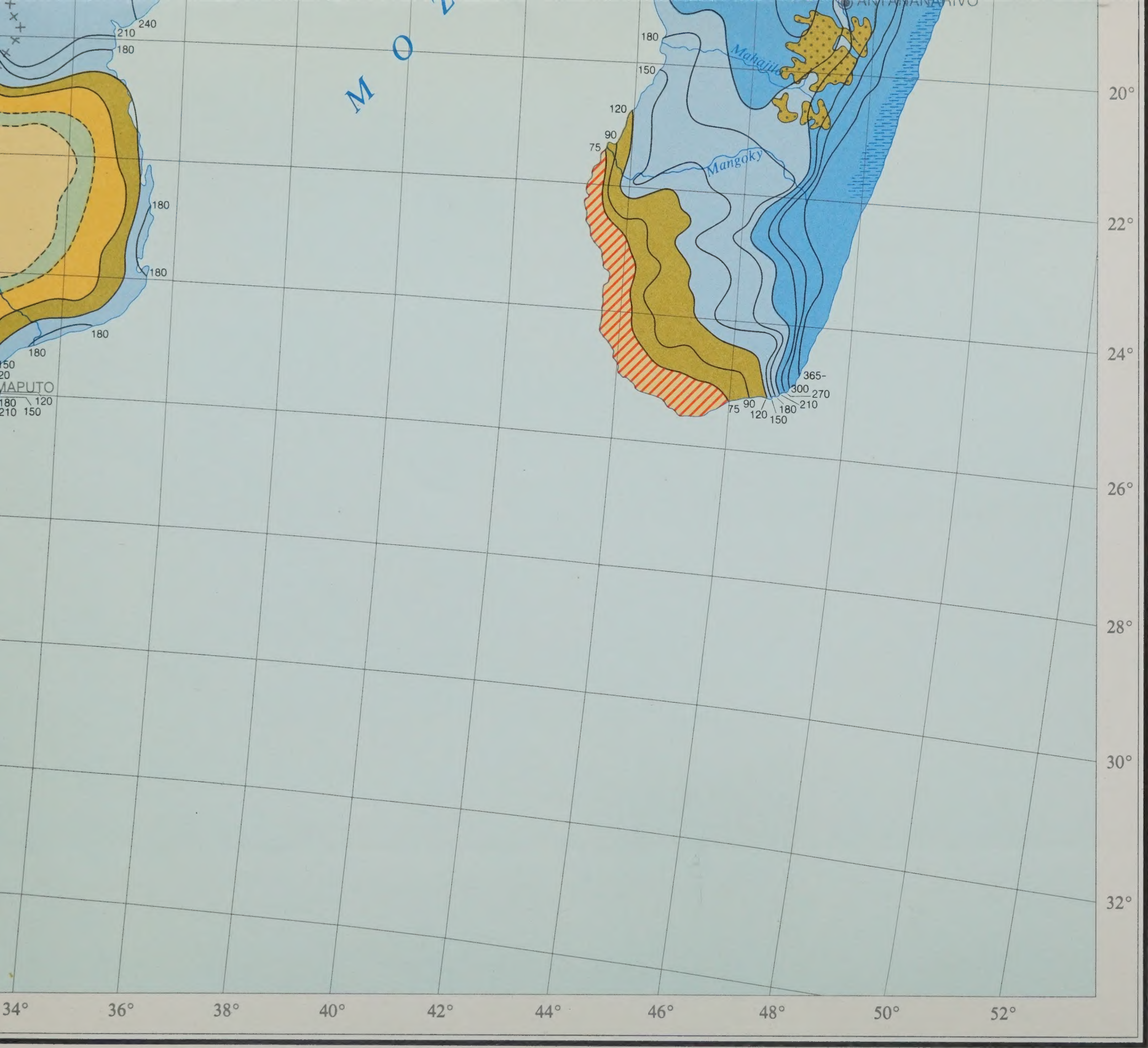
0　200　400　600　800　1000 Km

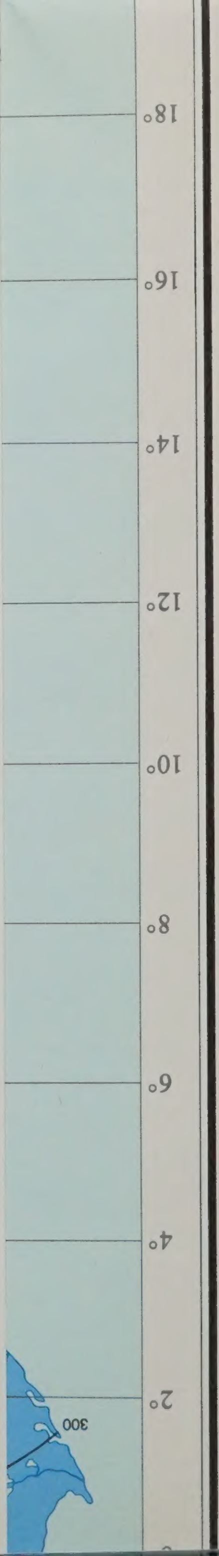
(approx.) 1:10.000.000

PERSONNES/HA PERSONS/HA		HA/PERSONNE HA/PERSON
moins de 0.1 less than 0.1	🟨	plus de 10 more than 10
0.1 - 0.5	🟧	10.0 - 2.0
0.51 - 1.0	🟩	1.99 - 1.0
1.01 - 2.0	🟩	0.99 - 0.5
2.01 - 5.0	🟫	0.49 - 0.2
5.01 - 10.0	🟦	0.19 - 0.1
plus de 10 more than 10	🟦	moins de 0.1 less than 0.1
capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	□ ░ ▒	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	● ● ●	sub-tropical regions winter rainfall
régions tempérées	┴ ┴ ┴	temperate regions
durée de la période de croissance de type normal	～120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	‐‐90	length of intermediate type of growing period
régions désertiques	0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	～	main rivers and lakes
principales zones irriguées	▦	main irrigated areas

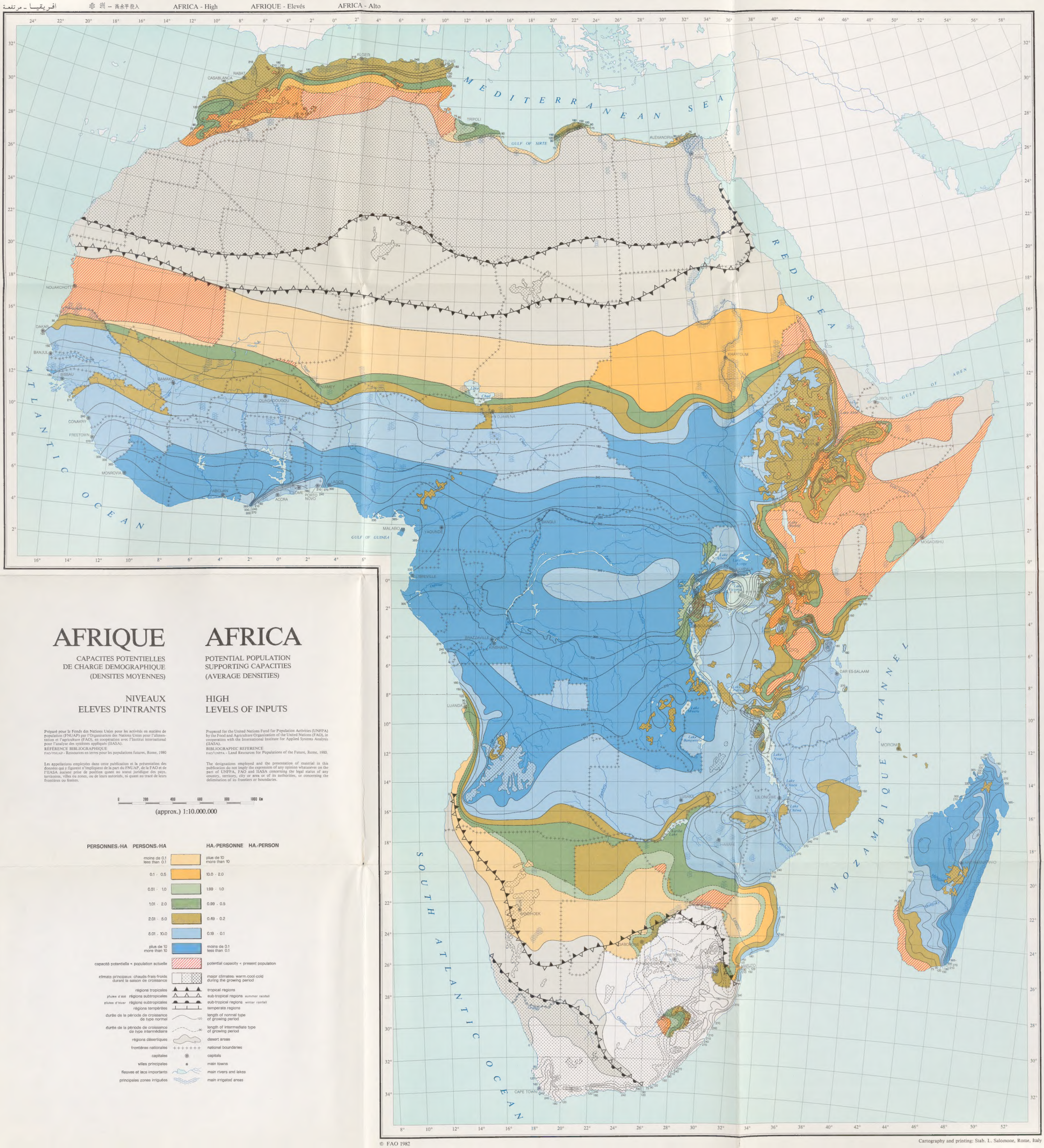
© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy





Cartography and printing: Stab. L. Salomone, Rome, Italy



AFRIQUE

CAPACITES POTENTIELLES
DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX
ELEVES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

AFRICA

POTENTIAL POPULATION
SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

HIGH
LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

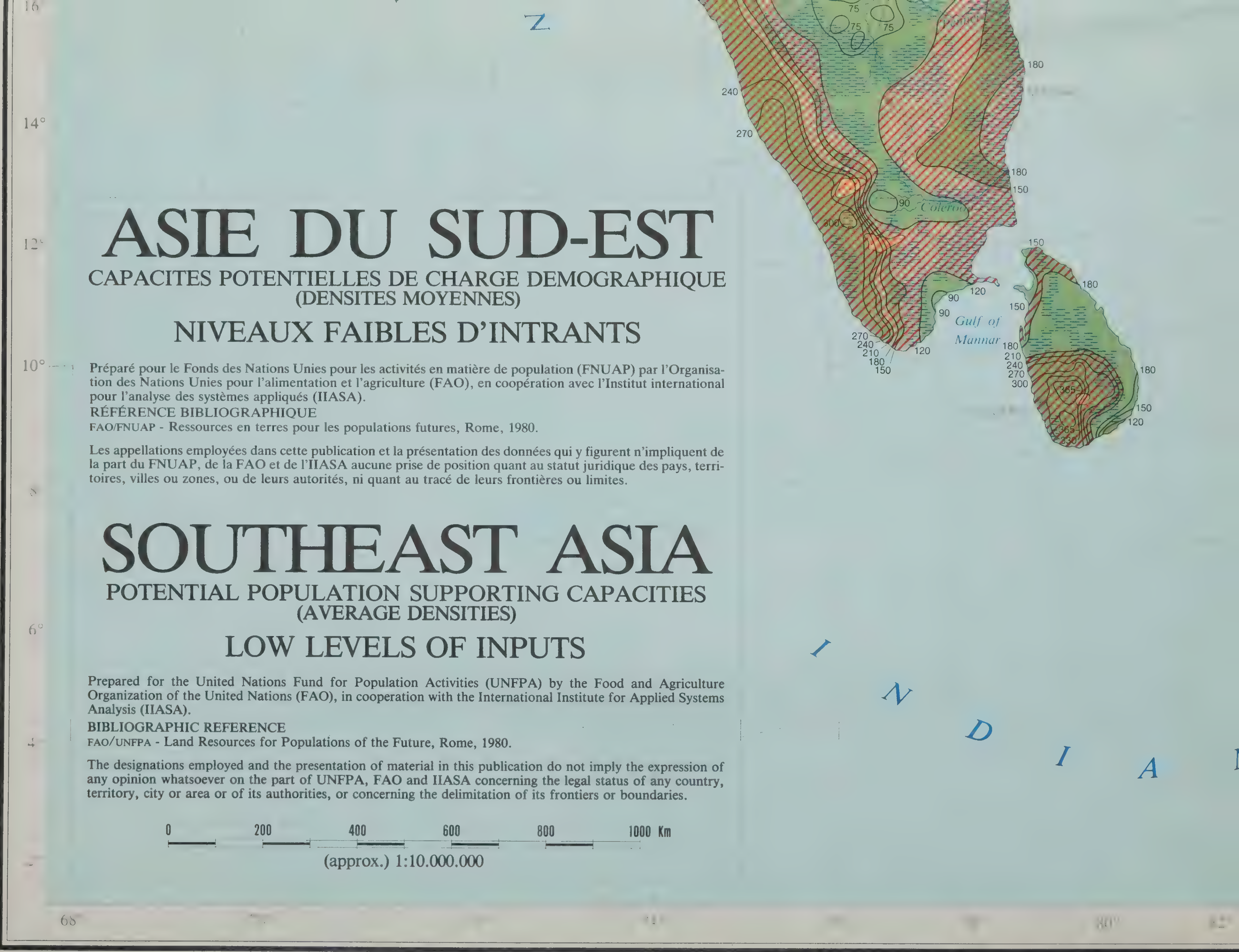
0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

PERSONNES/HA PERSONS/HA		HA/PERSONNE HA/PERSON
moins de 0.1 less than 0.1	🟨	plus de 10 more than 10
0.1 - 0.5	🟧	10.0 - 2.0
0.51 - 1.0	🟩	1.99 - 1.0
1.01 - 2.0	🟩	0.99 - 0.5
2.01 - 5.0	🟫	0.49 - 0.2
5.01 - 10.0	🟦	0.19 - 0.1
plus de 10 more than 10	🟦	moins de 0.1 less than 0.1
capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	☐ ░ ▒	major climates: warm/cool/cold during the growing period
régions tropicales	▲	tropical regions
pluies d'été régions subtropicales	△	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	●	sub-tropical regions winter rainfall
régions tempérées	⊥	temperate regions
durée de la période de croissance de type normal	120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	90	length of intermediate type of growing period
régions désertiques	0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	~	main rivers and lakes
principales zones irriguées	≈	main irrigated areas

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy



ASIE DU SUD-EST

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX FAIBLES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

SOUTHEAST ASIA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

LOW LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

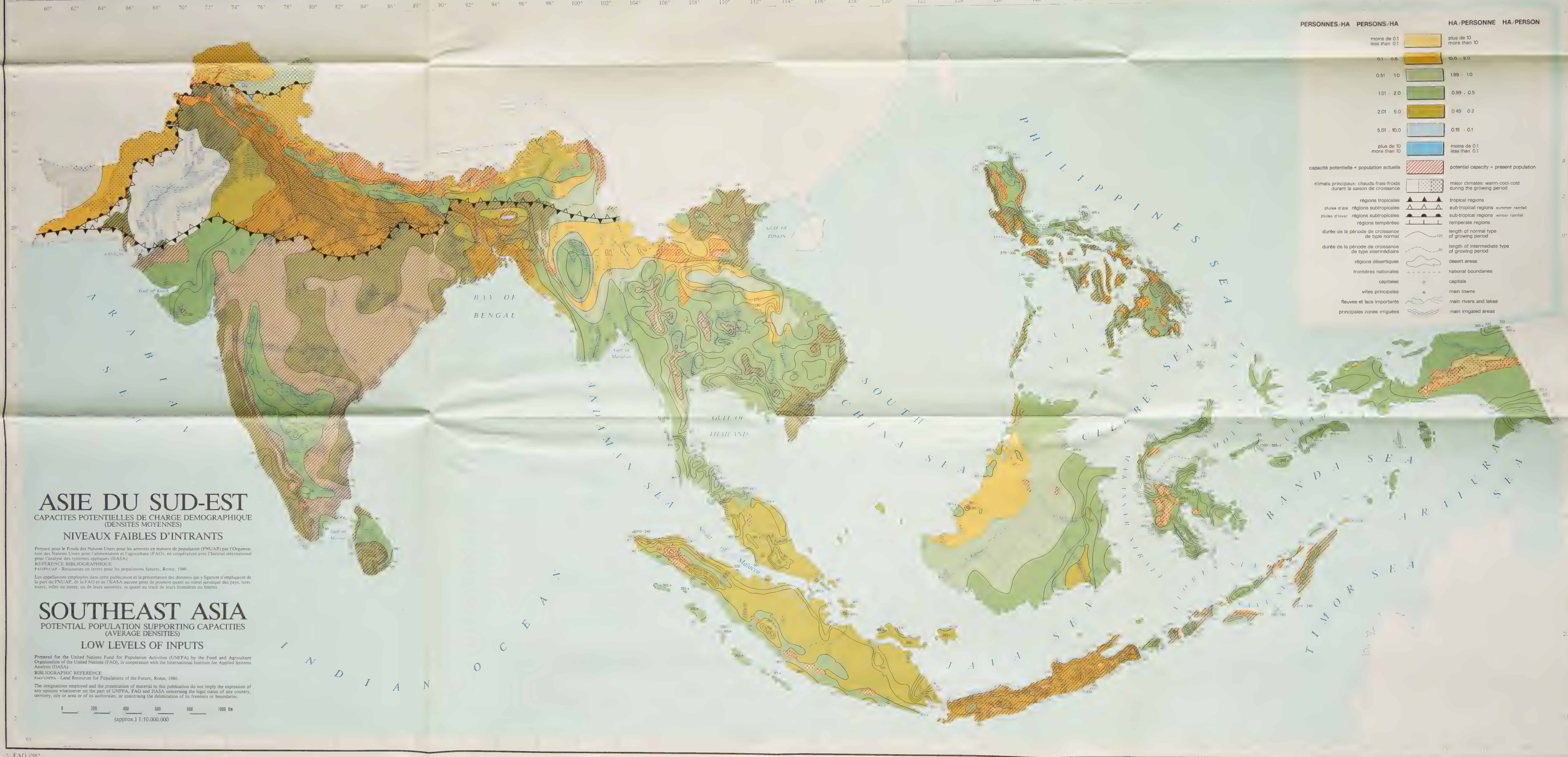
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

© FAO 1982



PERSONNES/HA	PERSONS/HA		HA/PERSONNE	HA/PERSON
moins de 0.1	less than 0.1	🟨	plus de 10	more than 10
0.1 - 0.5		🟧	10.0 - 2.0	
0.51 - 1.0		🟩	1.99 - 1.0	
1.01 - 2.0		🟩	0.99 - 0.5	
2.01 - 5.0		🟫	0.49 - 0.2	
5.01 - 10.0		⬜	0.19 - 0.1	
plus de 10	more than 10	🟦	moins de 0.1	less than 0.1

capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	☐ ⛆ ⛆	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	◗ ◗ ◗	sub-tropical regions winter rainfall
régions tempérées	⊥ ⊥ ⊥	temperate regions
durée de la période de croissance de type normal	～120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	┄90	length of intermediate type of growing period
régions désertiques	0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	～	main rivers and lakes
principales zones irriguées	┄	main irrigated areas

ASIE DU SUD-EST
CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)
NIVEAUX FAIBLES D'INTRANTS

Preparé pour le Fonds des Nations Unies pour les activités en matiere de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA)

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

SOUTHEAST ASIA
POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)
LOW LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

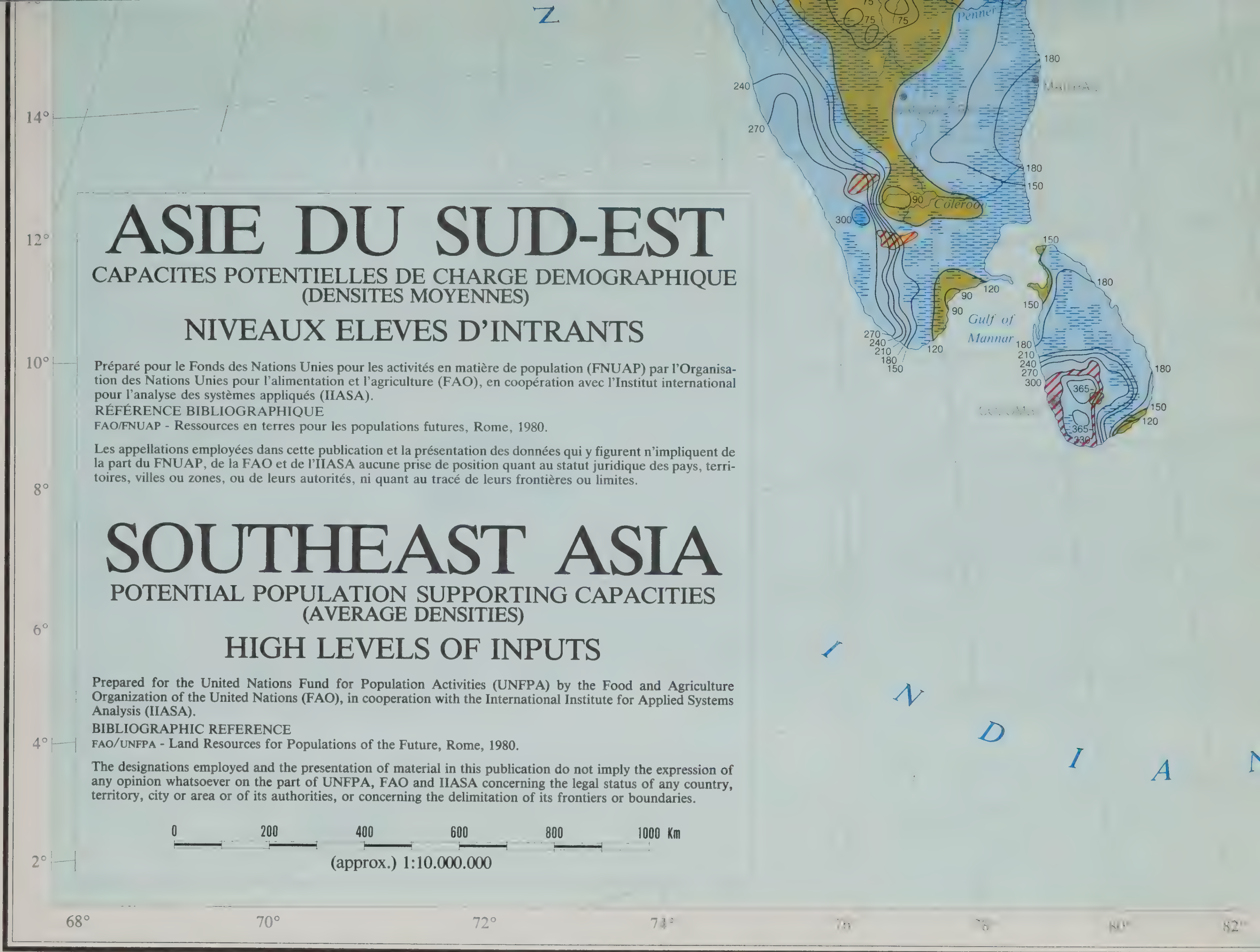
BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km
(approx.) 1:10.000.000

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy



ASIE DU SUD-EST

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX ELEVES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

SOUTHEAST ASIA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

HIGH LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

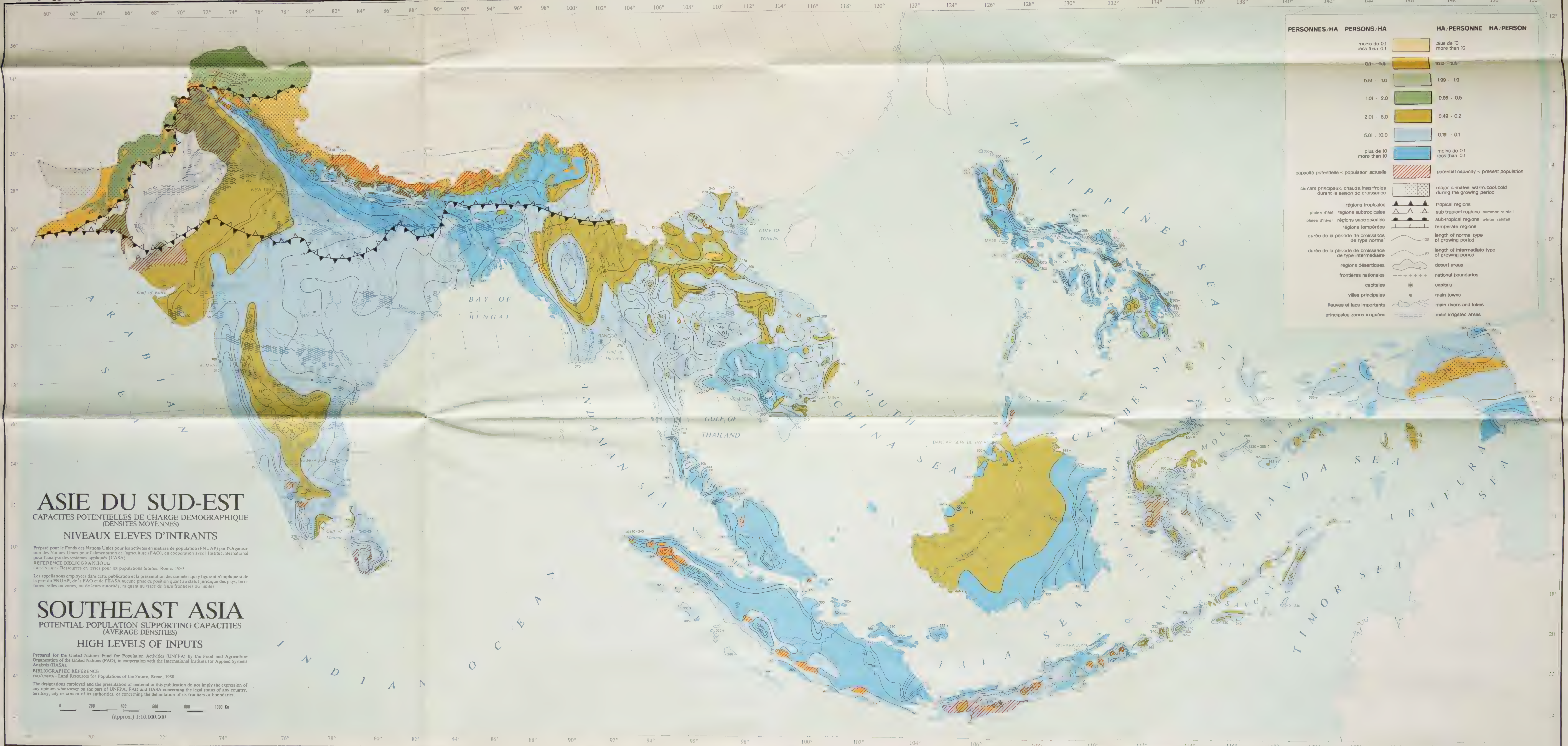
The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

© FAO 1982

جنوب شرق آسيا - مرتفعة　东南亚 – 高水平投入　SOUTHEAST ASIA - High　ASIE DU SUD-EST - Elevés　SUDESTE DE ASIA - Alto



ASIE DU SUD-EST

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE (DENSITES MOYENNES)

NIVEAUX ELEVES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites

SOUTHEAST ASIA

POTENTIAL POPULATION SUPPORTING CAPACITIES (AVERAGE DENSITIES)

HIGH LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

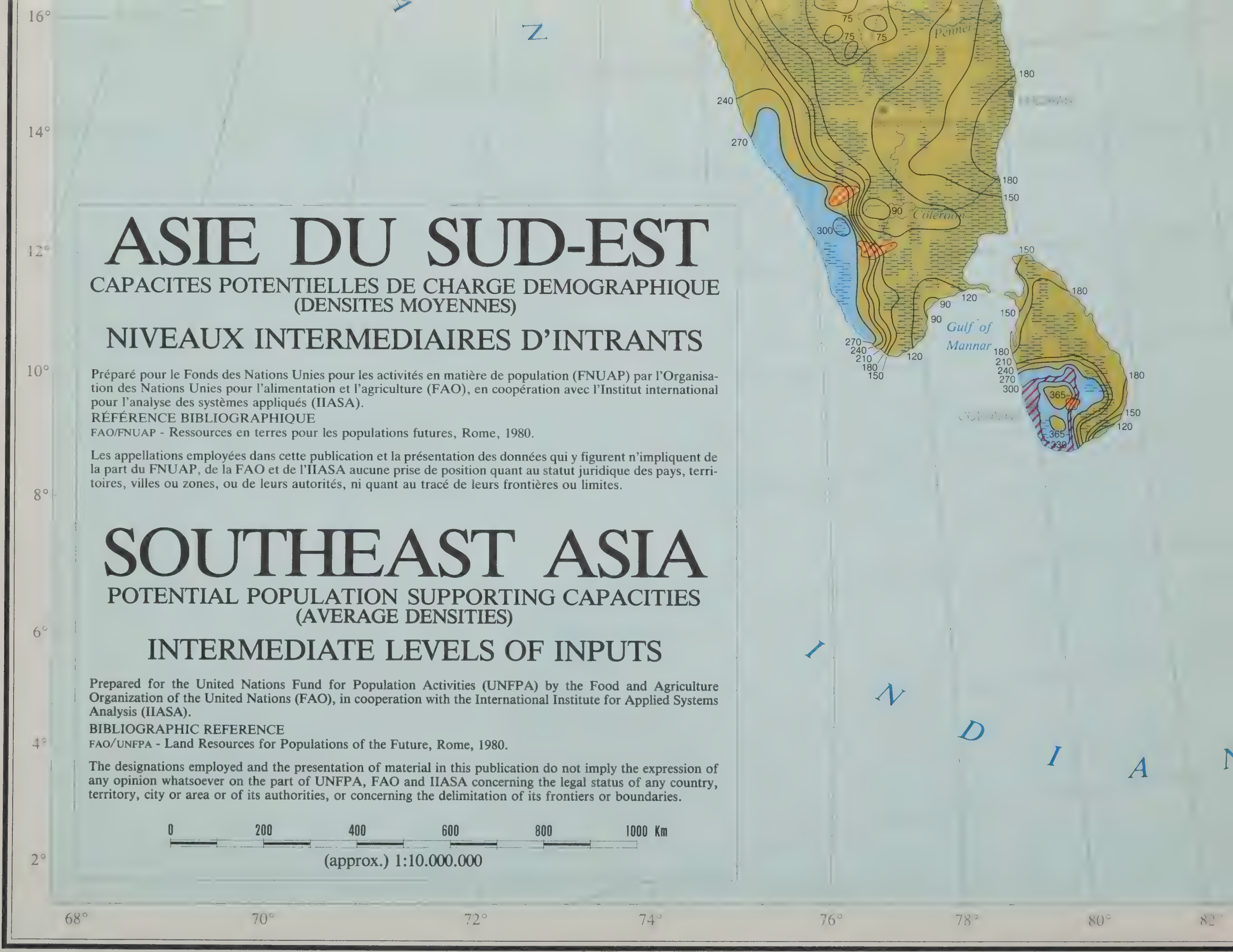
The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km
(approx.) 1:10.000.000

PERSONNES/HA PERSONS/HA		HA/PERSONNE HA/PERSON
moins de 0.1 less than 0.1	▭	plus de 10 more than 10
0.1 - 0.5	▬	10.0 - 2.0
0.51 - 1.0	▬	1.99 - 1.0
1.01 - 2.0	🟩	0.99 - 0.5
2.01 - 5.0	▬	0.49 - 0.2
5.01 - 10.0	▭	0.19 - 0.1
plus de 10 more than 10	🟦	moins de 0.1 less than 0.1
capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	▭ ░ ▒	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	● ● ●	sub-tropical regions winter rainfall
régions tempérées	┴ ┴ ┴	temperate regions
durée de la période de croissance de type normal	~ 120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	- - 90	length of intermediate type of growing period
régions désertiques	0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	~	main rivers and lakes
principales zones irriguées	≡	main irrigated areas

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy



ASIE DU SUD-EST

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX INTERMEDIAIRES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

SOUTHEAST ASIA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

INTERMEDIATE LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

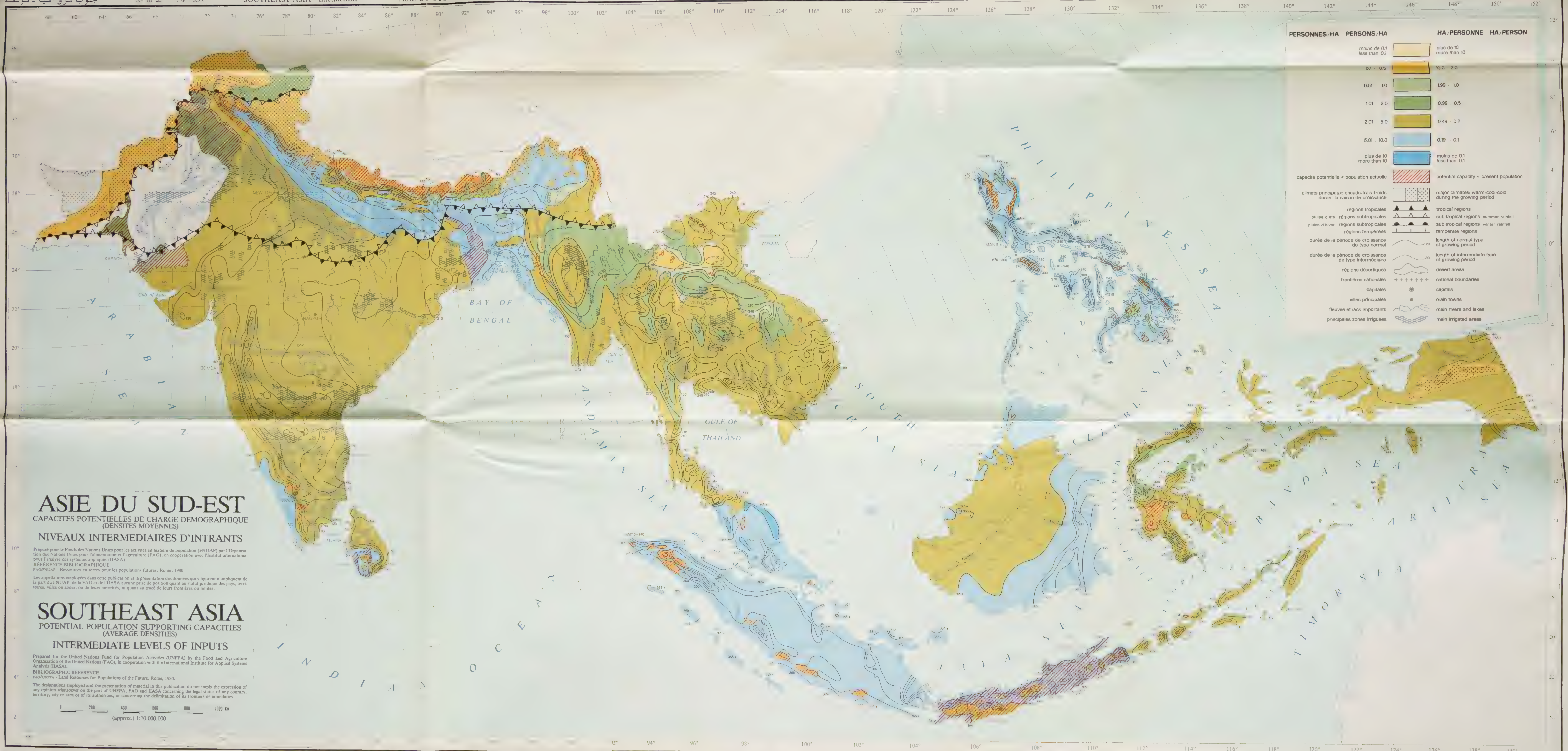
The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

© FAO 1982

جنوب شرق آسيا ـ متوسطة　　东南亚 — 中水平投入　　SOUTHEAST ASIA - Intermediate　　ASIE DU SUD-EST - Intermédiaires　　SUDESTE DE ASIA - Intermedio



PERSONNES/HA	PERSONS/HA		HA/PERSONNE	HA/PERSON
moins de 0.1	less than 0.1	🟨	plus de 10	more than 10
0.1 - 0.5		🟧	10.0 - 2.0	
0.51 - 1.0		🟩	1.99 - 1.0	
1.01 - 2.0		🟩	0.99 - 0.5	
2.01 - 5.0		🟨	0.49 - 0.2	
5.01 - 10.0		🟦	0.19 - 0.1	
plus de 10	more than 10	🟦	moins de 0.1	less than 0.1

capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	☐ ░ ▒	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	◓ ◓ ◓	sub-tropical regions winter rainfall
régions tempérées	┴ ┴ ┴	temperate regions
durée de la période de croissance de type normal	～ 120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	- - - 90	length of intermediate type of growing period
régions désertiques	0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	～	main rivers and lakes
principales zones irriguées	≡	main irrigated areas

ASIE DU SUD-EST

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX INTERMEDIAIRES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA)

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

SOUTHEAST ASIA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

INTERMEDIATE LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0　200　400　600　800　1000 Km

(approx.) 1:10.000.000

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy

AFRIQUE

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX INTERMEDIAIRES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

AFRICA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

INTERMEDIATE LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

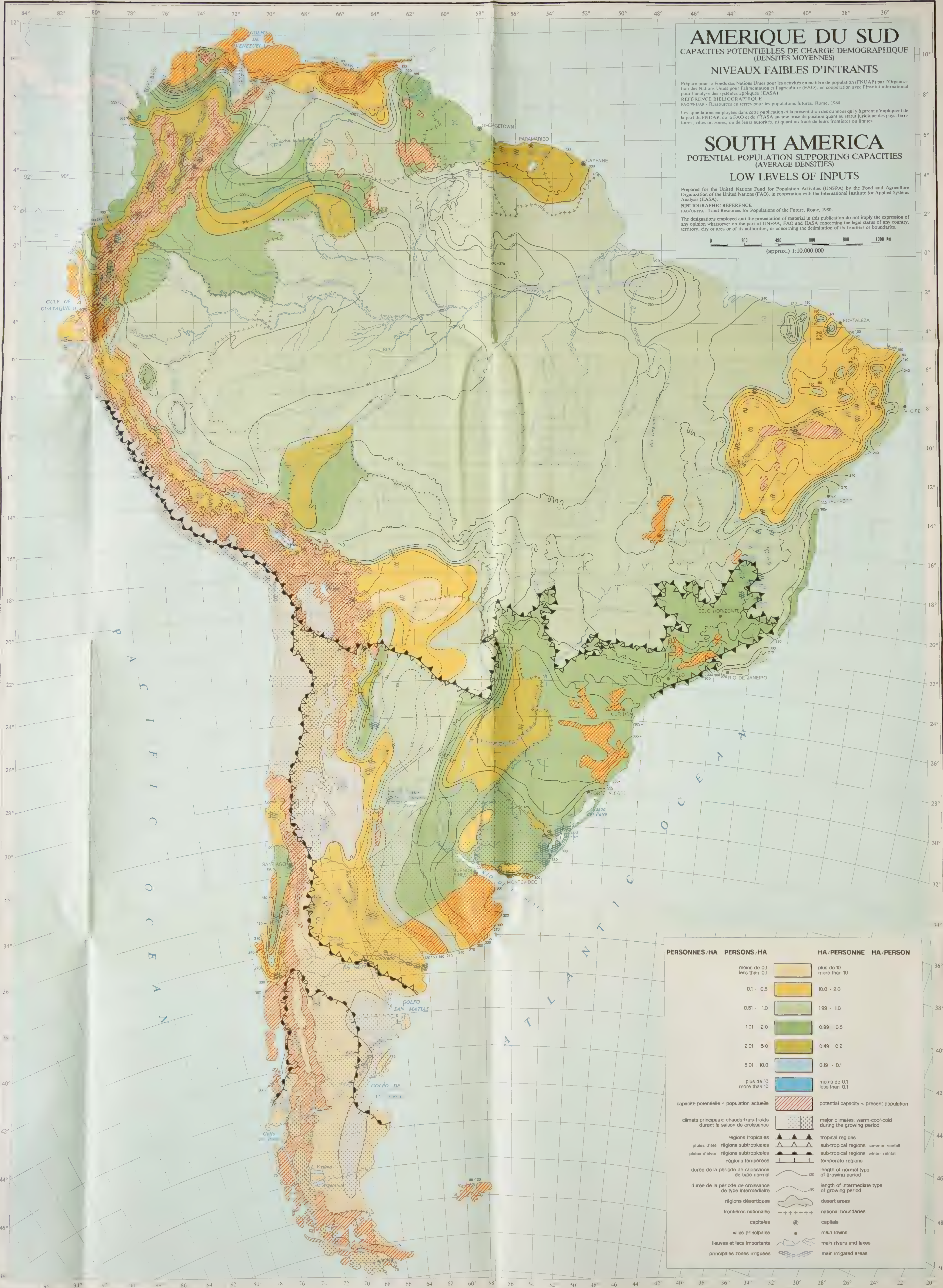
BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

(approx.) 1:10.000.000

PERSONNES/HA PERSONS/HA **HA/PERSONNE HA/PERSON**

moins de 0.1 ▨ plus de 10



AMERIQUE DU SUD

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE (DENSITES MOYENNES)

NIVEAUX FAIBLES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

SOUTH AMERICA

POTENTIAL POPULATION SUPPORTING CAPACITIES (AVERAGE DENSITIES)

LOW LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

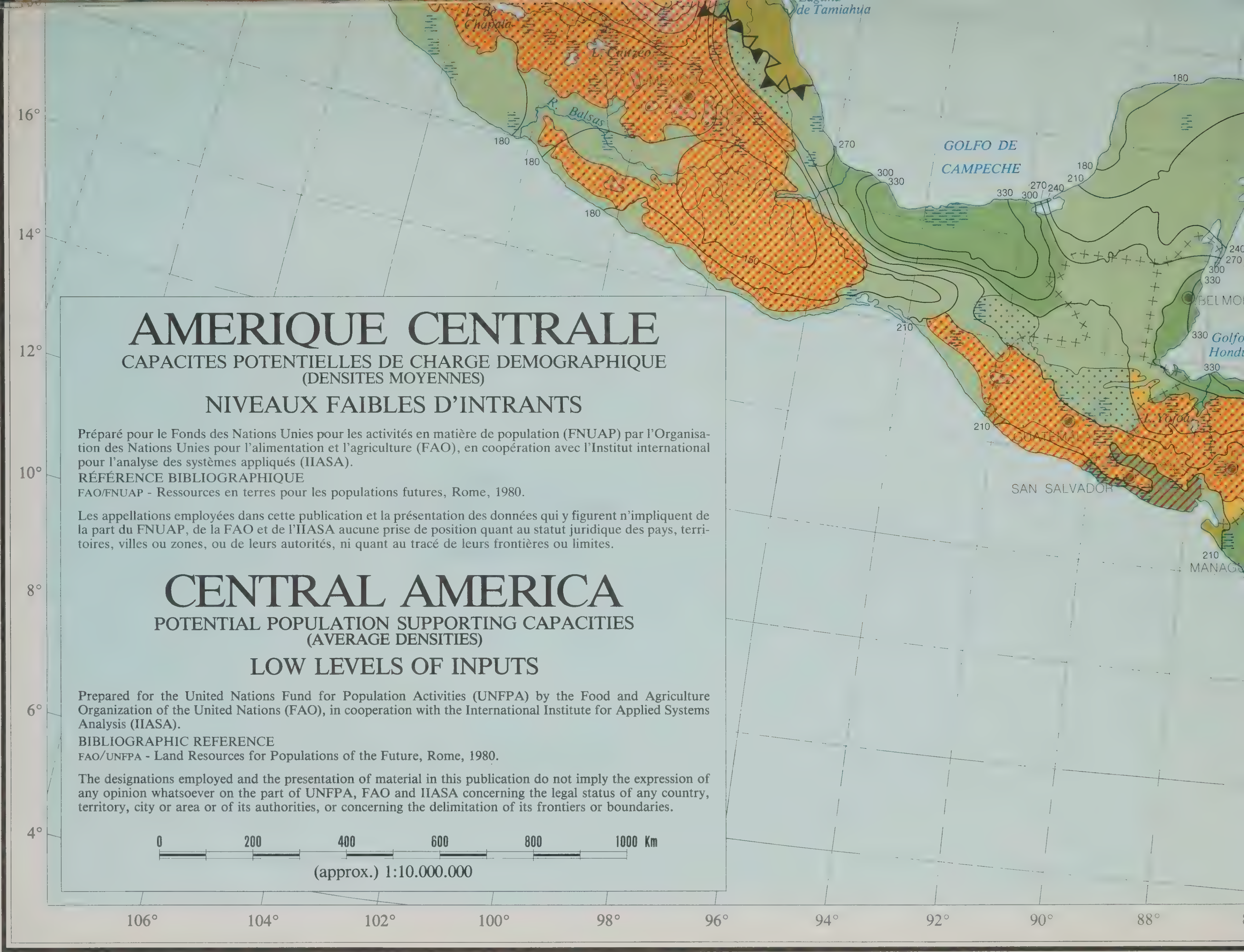
PERSONNES/HA PERSONS/HA		HA/PERSONNE HA/PERSON
moins de 0.1 less than 0.1	🟨	plus de 10 more than 10
0.1 - 0.5	🟧	10.0 - 2.0
0.51 - 1.0	🟩	1.99 - 1.0
1.01 2.0	🟩	0.99 0.5
2.01 5.0	🟨	0.49 0.2
5.01 - 10.0	🟦	0.19 - 0.1
plus de 10 more than 10	🟦	moins de 0.1 less than 0.1
capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	□ ░ ▒	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	◓ ◓ ◓	sub-tropical regions winter rainfall
régions tempérées	┴ ┴ ┴	temperate regions
durée de la période de croissance de type normal	～120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	‐‐‐90	length of intermediate type of growing period
régions désertiques	～0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	～	main rivers and lakes
principales zones irriguées	≡	main irrigated areas

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy

STAB. LUIGI SALOMONE - ROMA -

STAB. LUIGI SALOMONE - ROMA -



AMERIQUE CENTRALE

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX FAIBLES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

CENTRAL AMERICA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

LOW LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

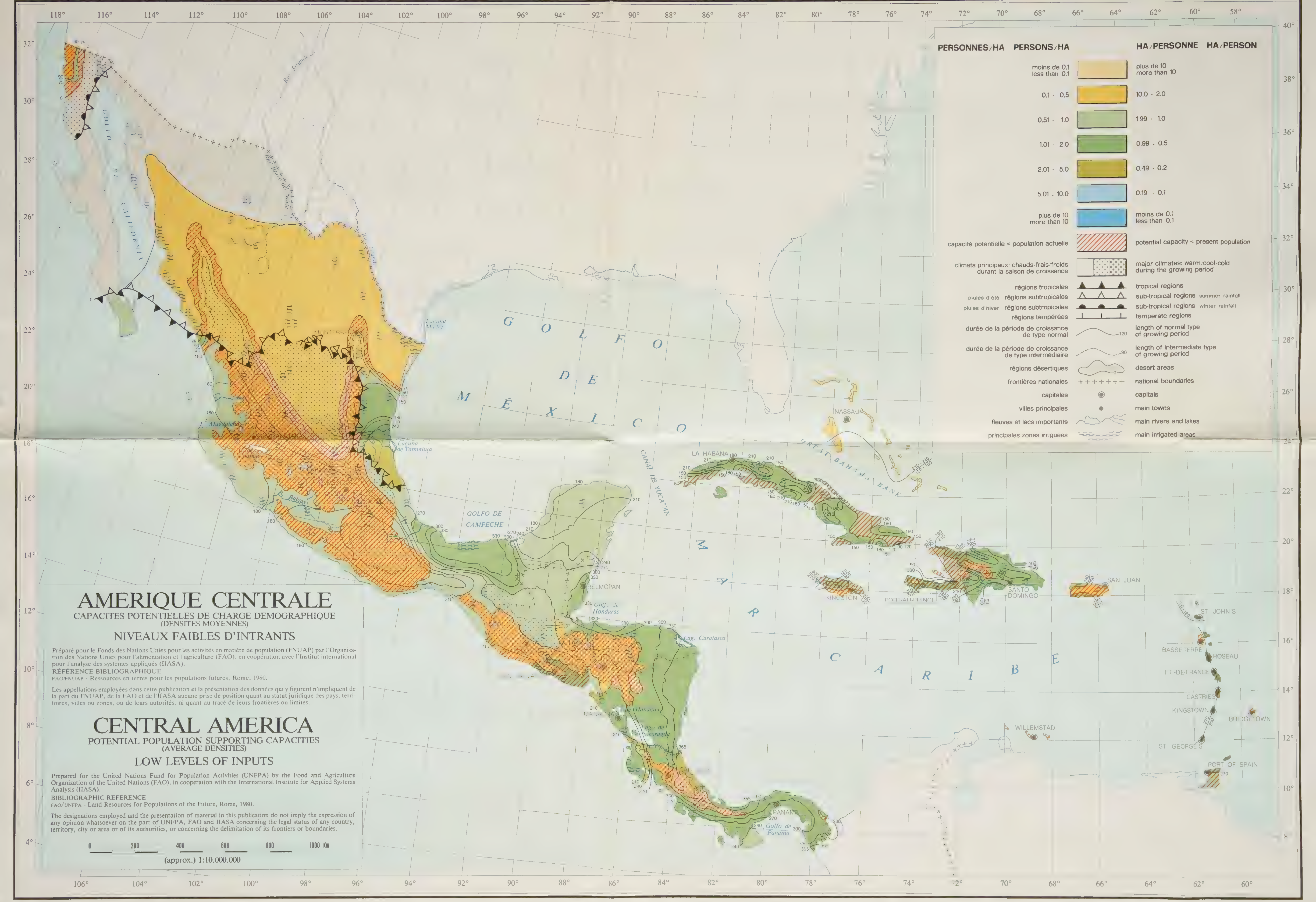
The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

© FAO 1982

أمريكا الوسطى - منخفضة　中美洲 — 低水平投入　CENTRAL AMERICA - Low　AMERIQUE CENTRALE - Faibles　AMERICA CENTRAL - Bajo



PERSONNES/HA	PERSONS/HA		HA/PERSONNE	HA/PERSON
moins de 0.1	less than 0.1	🟨	plus de 10	more than 10
0.1 - 0.5		🟧	10.0 - 2.0	
0.51 - 1.0		🟩	1.99 - 1.0	
1.01 - 2.0		🟩	0.99 - 0.5	
2.01 - 5.0		🟫	0.49 - 0.2	
5.01 - 10.0		🟦	0.19 - 0.1	
plus de 10	more than 10	🟦	moins de 0.1	less than 0.1

capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	☐ ░ ▒	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	◓ ◓ ◓	sub-tropical regions winter rainfall
régions tempérées	┴ ┴ ┴	temperate regions
durée de la période de croissance de type normal	～120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	- - -90	length of intermediate type of growing period
régions désertiques	0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	～	main rivers and lakes
principales zones irriguées	═	main irrigated areas

AMERIQUE CENTRALE

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX FAIBLES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

CENTRAL AMERICA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

LOW LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

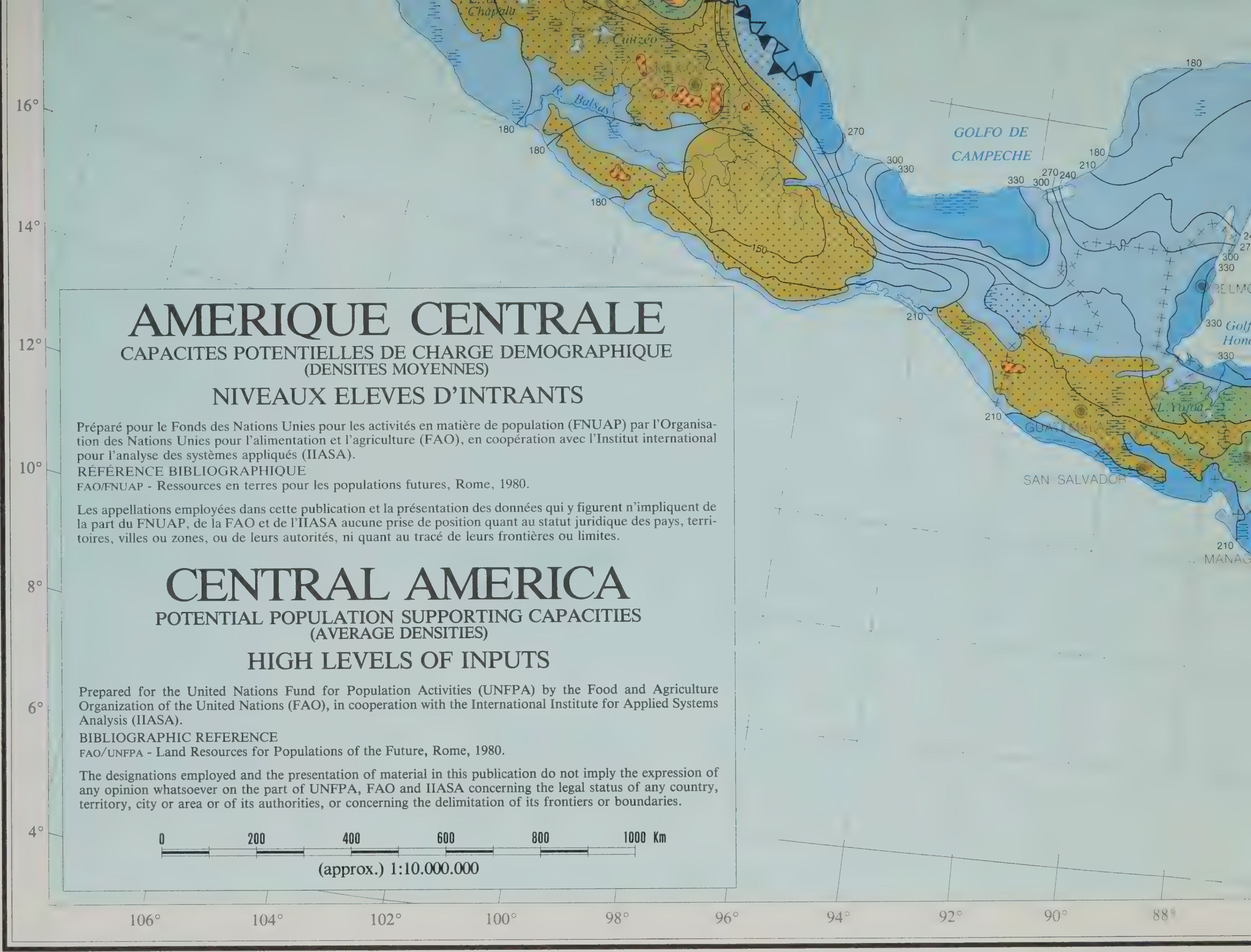
The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0　200　400　600　800　1000 Km

(approx.) 1:10.000.000

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy



AMERIQUE CENTRALE

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX ELEVES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

CENTRAL AMERICA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

HIGH LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

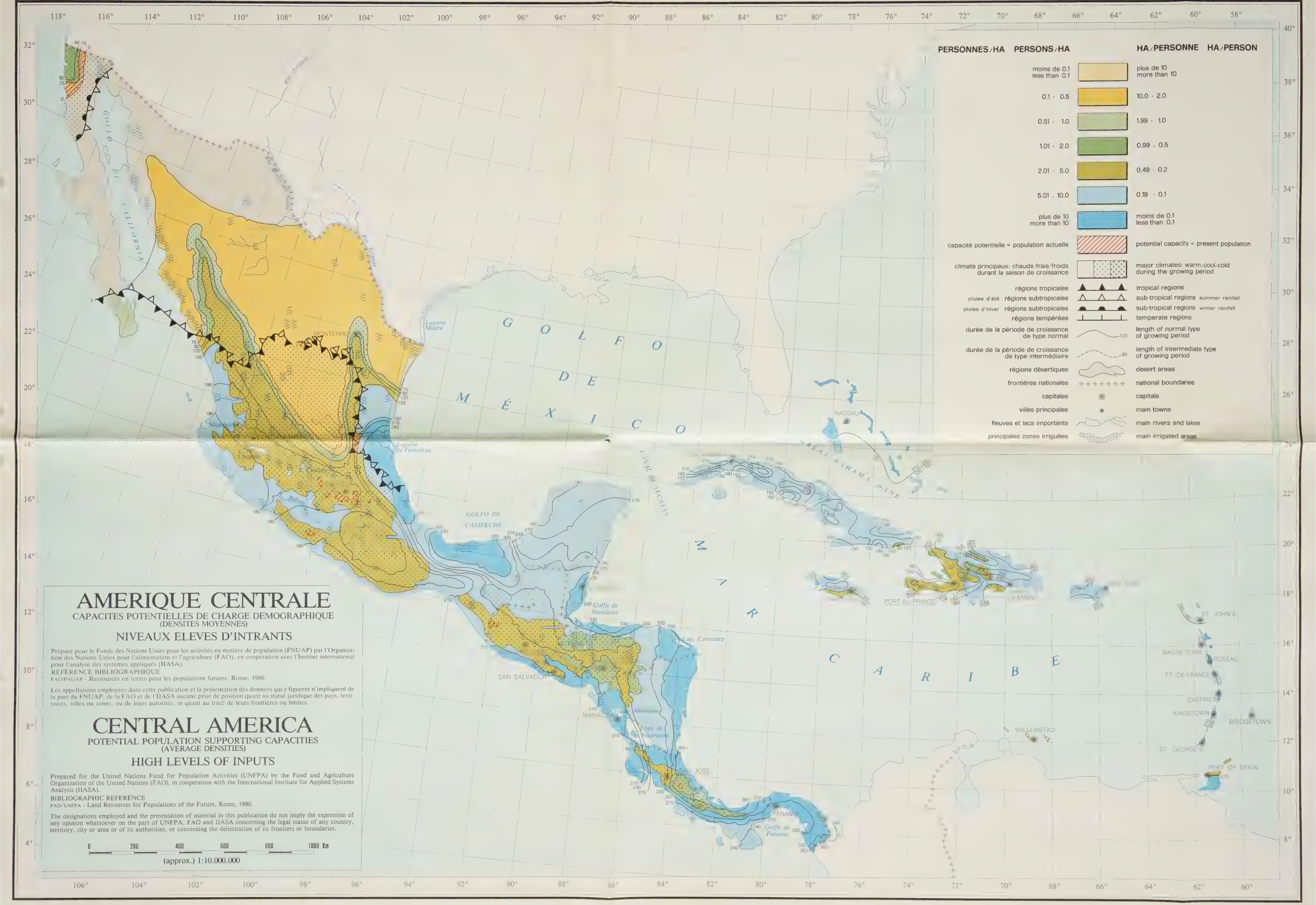
The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

© FAO 1982

أمريكا الوسطى - مرتفعة   中美洲 — 高水平投入   CENTRAL AMERICA - High   AMERIQUE CENTRALE - Elevés   AMERICA CENTRAL - Alto



PERSONNES/HA	PERSONS/HA		HA/PERSONNE	HA/PERSON
moins de 0.1	less than 0.1	🟨	plus de 10	more than 10
0.1 - 0.5		🟧	10.0 - 2.0	
0.51 - 1.0		🟩	1.99 - 1.0	
1.01 - 2.0		🟩	0.99 - 0.5	
2.01 - 5.0		🟨	0.49 - 0.2	
5.01 - 10.0		🟦	0.19 - 0.1	
plus de 10	more than 10	🟦	moins de 0.1	less than 0.1
capacité potentielle < population actuelle		▨	potential capacity < present population	
climats principaux: chauds/frais/froids durant la saison de croissance		☐ ░ ▒	major climates: warm/cool/cold during the growing period	
régions tropicales		▲ ▲ ▲	tropical regions	
pluies d'été régions subtropicales		△ △ △	sub-tropical regions summer rainfall	
pluies d'hiver régions subtropicales		● ● ●	sub-tropical regions winter rainfall	
régions tempérées		⊥ ⊥ ⊥	temperate regions	
durée de la période de croissance de type normal		～ 120	length of normal type of growing period	
durée de la période de croissance de type intermédiaire		- - - 90	length of intermediate type of growing period	
régions désertiques		0	desert areas	
frontières nationales		+ + + + + + +	national boundaries	
capitales		◉	capitals	
villes principales		●	main towns	
fleuves et lacs importants		～	main rivers and lakes	
principales zones irriguées		≡	main irrigated areas	

AMERIQUE CENTRALE
CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)
NIVEAUX ELEVES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

CENTRAL AMERICA
POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)
HIGH LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

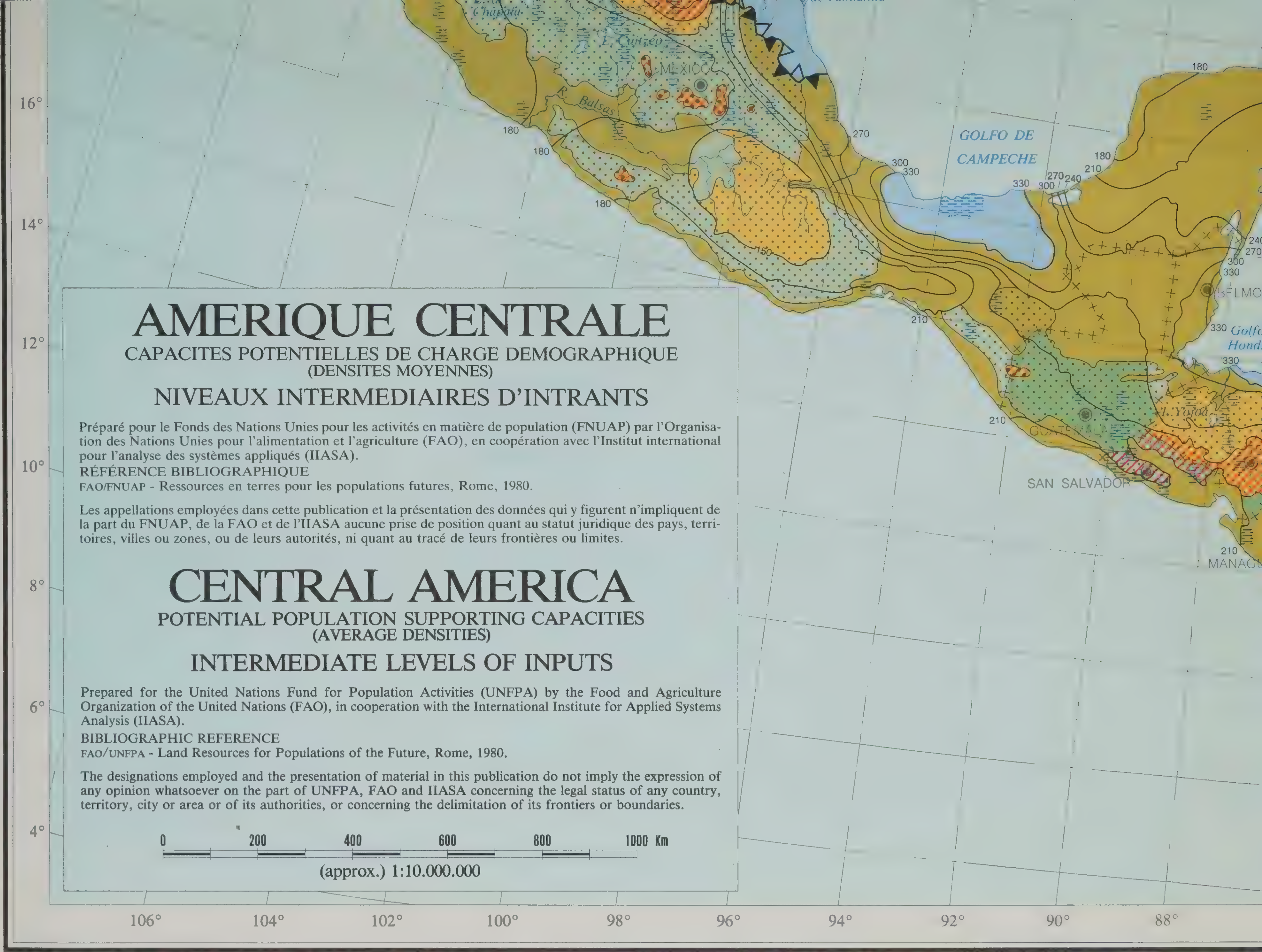
BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km
(approx.) 1:10.000.000

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy



AMERIQUE CENTRALE

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX INTERMEDIAIRES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

CENTRAL AMERICA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

INTERMEDIATE LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

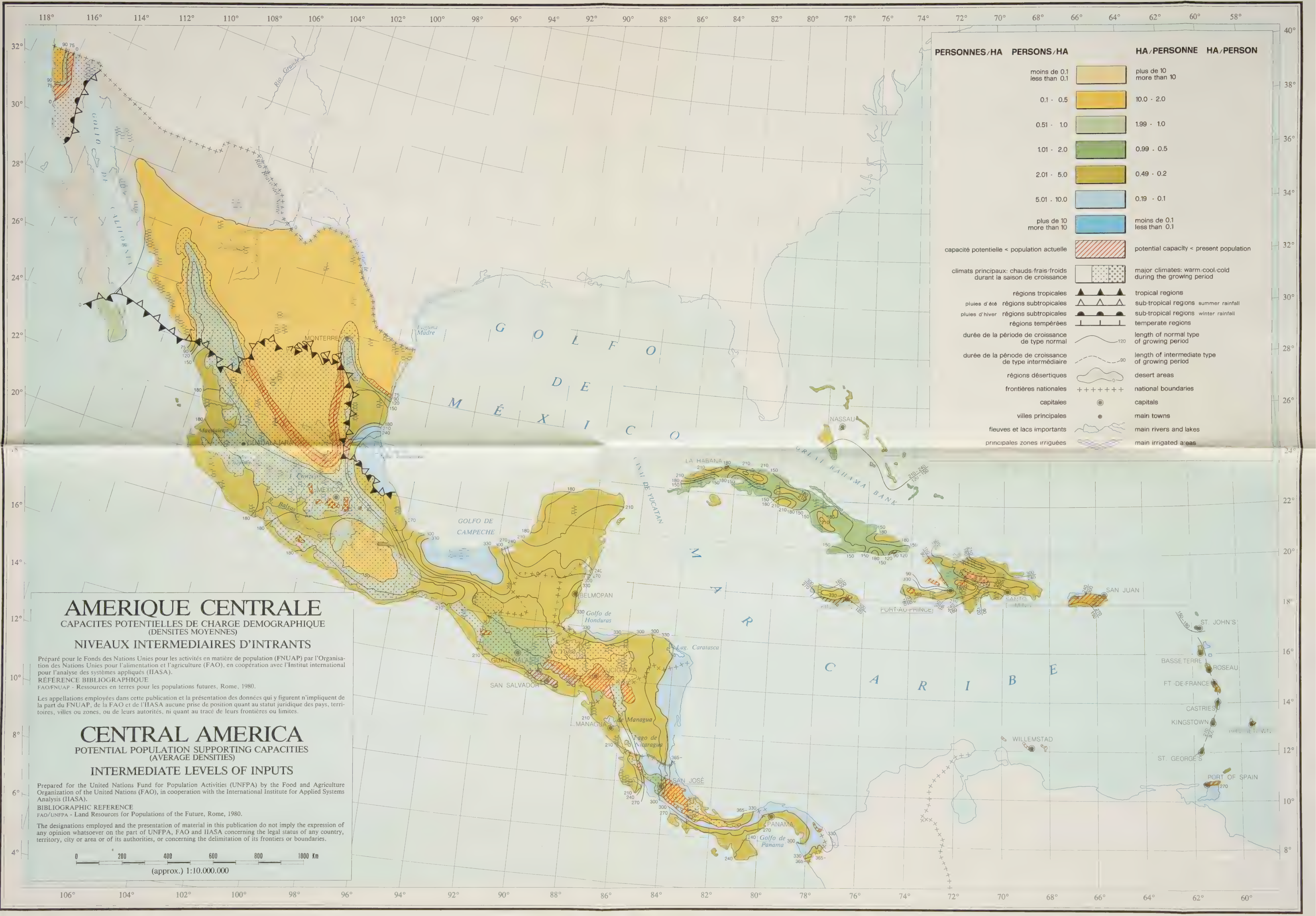
The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

© FAO 1982

أمريكا الوسطى - متوسطة   中美洲 – 中水平投入   CENTRAL AMERICA - Intermediate   AMERIQUE CENTRALE - Intermédiaires   AMERICA CENTRAL - Intermedio



PERSONNES/HA PERSONS/HA		HA/PERSONNE HA/PERSON
moins de 0.1 less than 0.1	🟨	plus de 10 more than 10
0.1 - 0.5	🟧	10.0 - 2.0
0.51 - 1.0	🟩	1.99 - 1.0
1.01 - 2.0	🟩	0.99 - 0.5
2.01 - 5.0	🟨	0.49 - 0.2
5.01 - 10.0	🟦	0.19 - 0.1
plus de 10 more than 10	🟦	moins de 0.1 less than 0.1
capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	☐ ░ ▒	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	◠ ◠ ◠	sub-tropical regions winter rainfall
régions tempérées	⊥ ⊥ ⊥	temperate regions
durée de la période de croissance de type normal	~ 120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	- - 90	length of intermediate type of growing period
régions désertiques	0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	~	main rivers and lakes
principales zones irriguées	≈	main irrigated areas

AMERIQUE CENTRALE

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX INTERMEDIAIRES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE
FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

CENTRAL AMERICA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

INTERMEDIATE LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

0 200 400 600 800 1000 Km
(approx.) 1:10.000.000

© FAO 1982

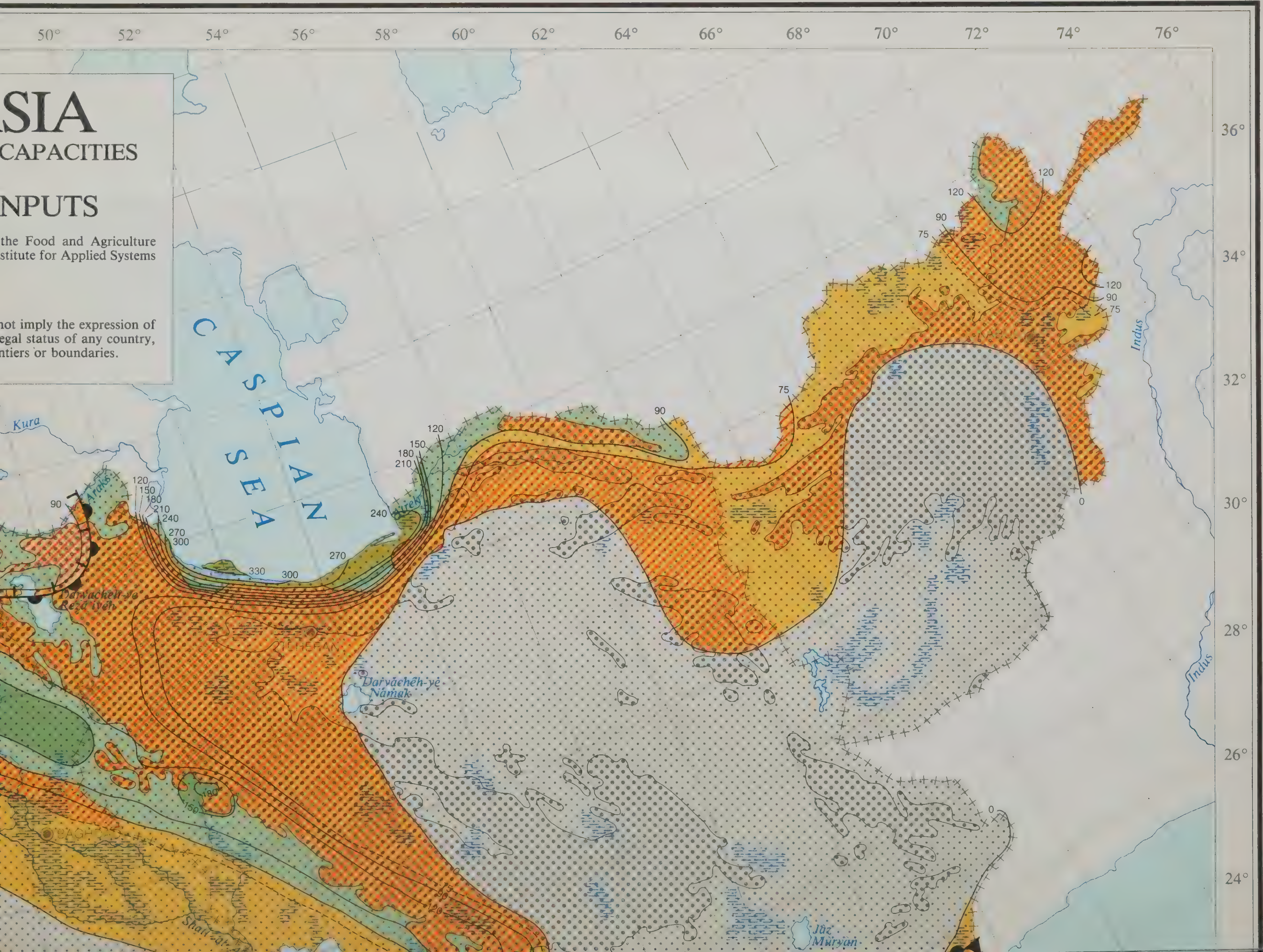
Cartography and printing: Stab. L. Salomone, Rome, Italy

SIA
CAPACITIES

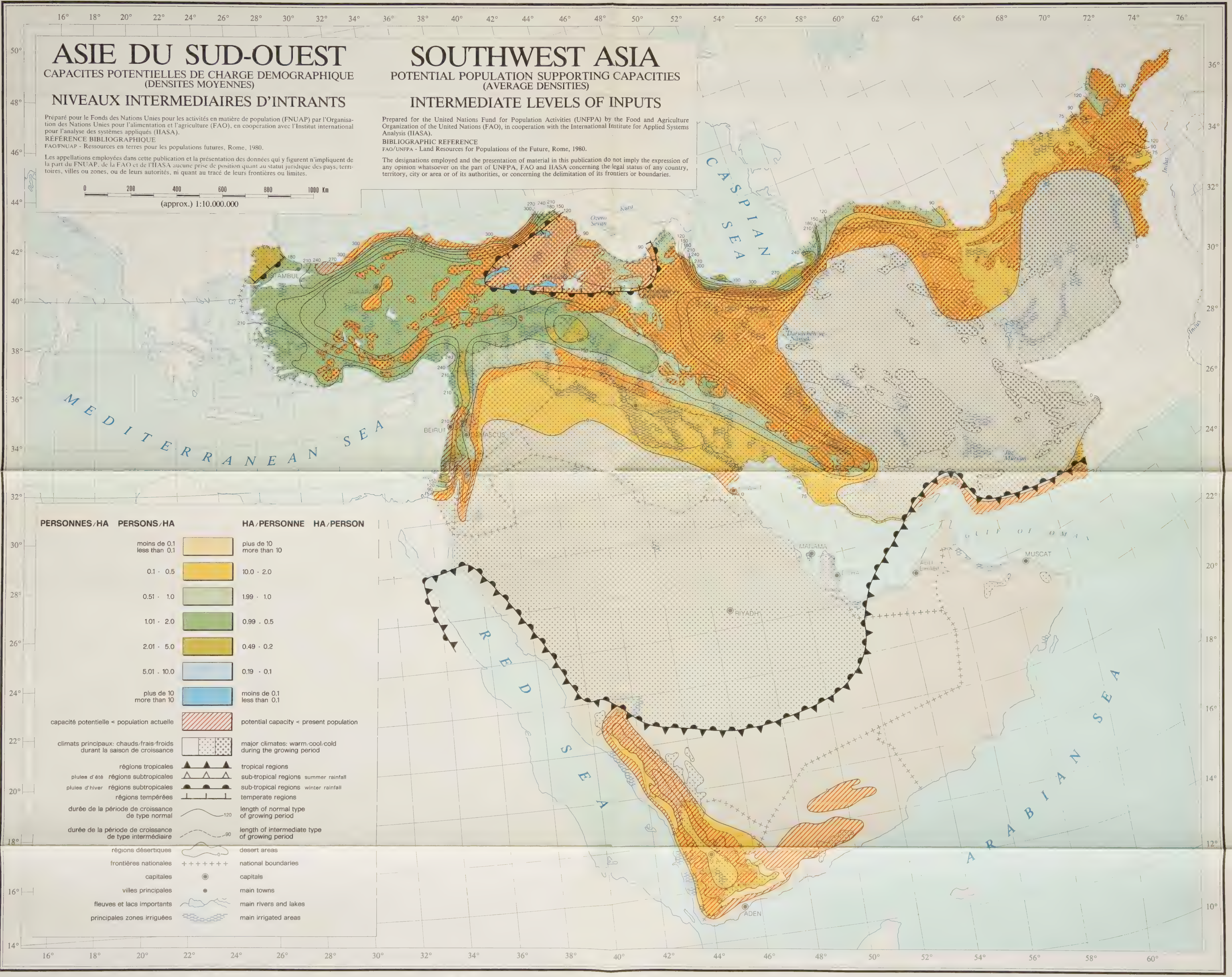
NPUTS

the Food and Agriculture
stitute for Applied Systems

not imply the expression of
egal status of any country,
ntiers or boundaries.



جنوب غرب آسيا ـ متوسطة 西 南 亚 – 中水平投入 SOUTHWEST ASIA - Intermediate ASIE DU SUD-OUEST - Intermédiaires SUDOESTE DE ASIA - Intermedio



ASIE DU SUD-OUEST

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE (DENSITES MOYENNES)

NIVEAUX INTERMEDIAIRES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

SOUTHWEST ASIA

POTENTIAL POPULATION SUPPORTING CAPACITIES (AVERAGE DENSITIES)

INTERMEDIATE LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

PERSONNES/HA PERSONS/HA		HA/PERSONNE HA/PERSON
moins de 0.1 less than 0.1	🟨	plus de 10 more than 10
0.1 - 0.5	🟧	10.0 - 2.0
0.51 - 1.0	🟩	1.99 - 1.0
1.01 - 2.0	🟩	0.99 - 0.5
2.01 - 5.0	🟨	0.49 - 0.2
5.01 - 10.0	🟦	0.19 - 0.1
plus de 10 more than 10	🟦	moins de 0.1 less than 0.1
capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	☐ ⁘ ⁙	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	● ● ●	sub-tropical regions winter rainfall
régions tempérées	┴ ┴ ┴	temperate regions
durée de la période de croissance de type normal	～120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	- - -90	length of intermediate type of growing period
régions désertiques	0	desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	～	main rivers and lakes
principales zones irriguées	≡	main irrigated areas

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy

ASIE DU SUD-OUEST

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX FAIBLES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

SOUTHWEST A

POTENTIAL POPULATION SUPPORTING
(AVERAGE DENSITIES)

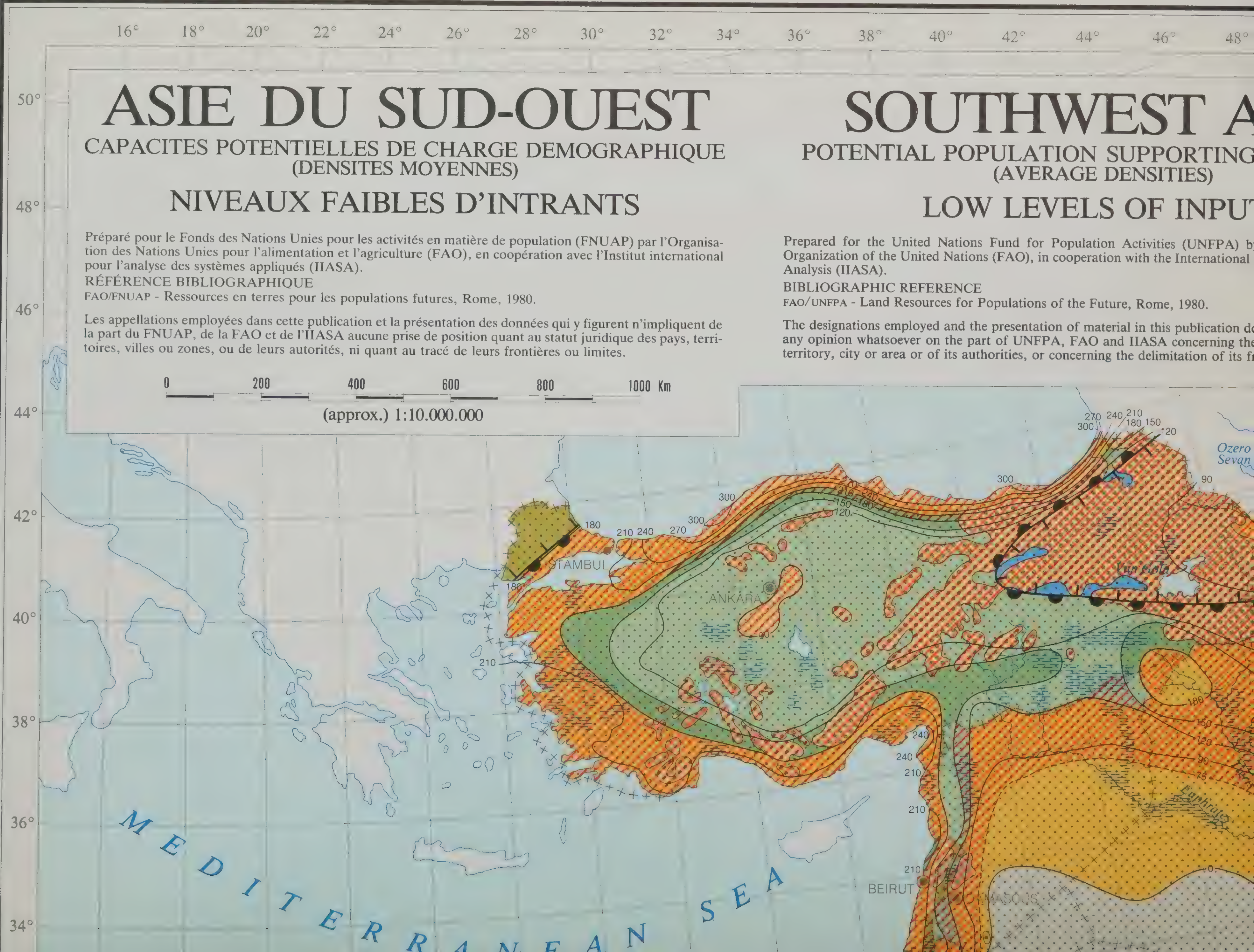
LOW LEVELS OF INPU

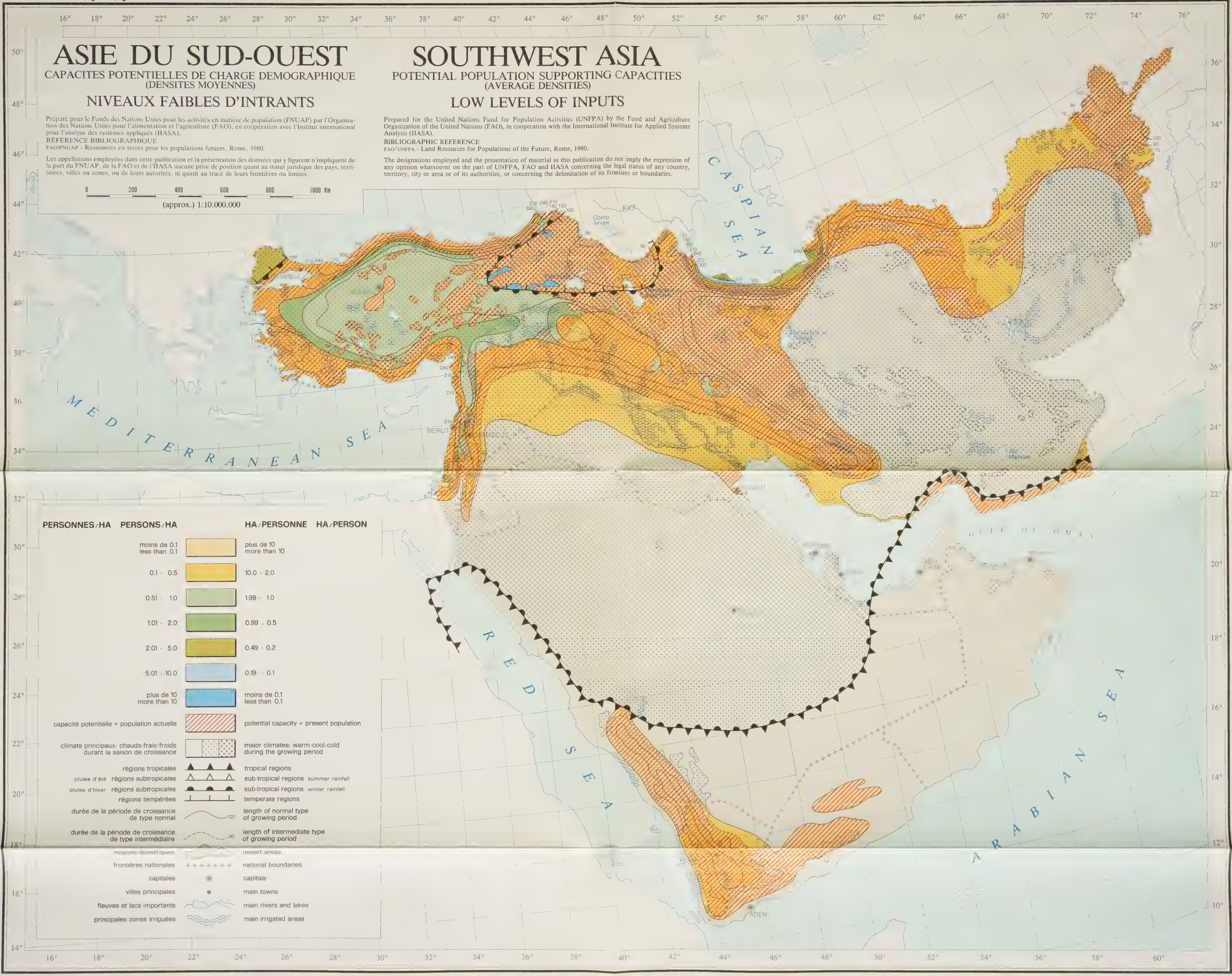
Prepared for the United Nations Fund for Population Activities (UNFPA) b
Organization of the United Nations (FAO), in cooperation with the International
Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do
any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the
territory, city or area or of its authorities, or concerning the delimitation of its fr





ASIE DU SUD-OUEST

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX FAIBLES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

SOUTHWEST ASIA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

LOW LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

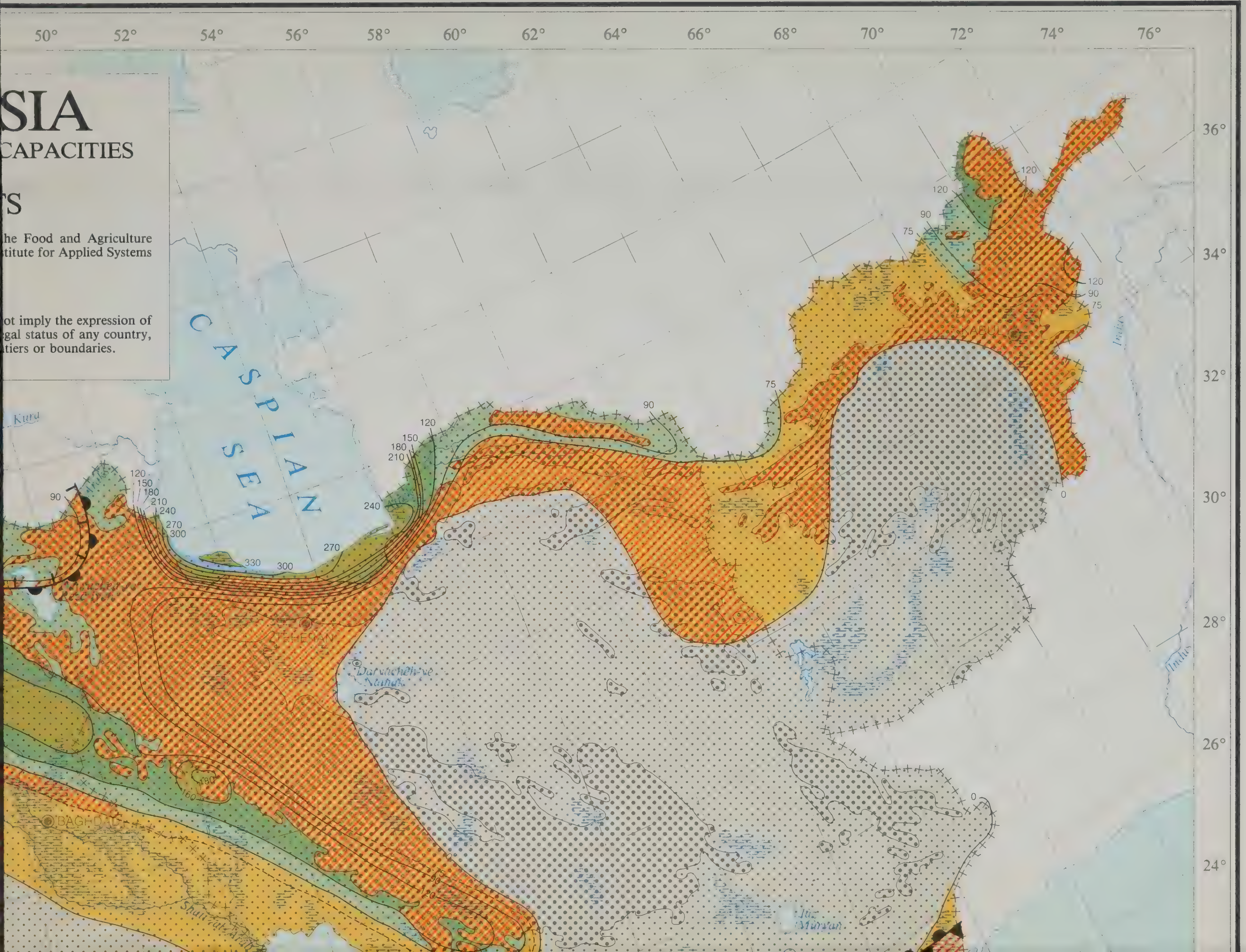
FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

PERSONNES/HA PERSONS/HA		HA/PERSONNE HA/PERSON
moins de 0.1 less than 0.1	⬜	plus de 10 more than 10
0.1 - 0.5	🟨	10.0 - 2.0
0.51 - 1.0	🟩	1.99 - 1.0
1.01 - 2.0	🟩	0.99 - 0.5
2.01 - 5.0	🟫	0.49 - 0.2
5.01 - 10.0	🟦	0.19 - 0.1
plus de 10 more than 10	🟦	moins de 0.1 less than 0.1
capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	⬜ ░ ▒	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	◗ ◗ ◗	sub-tropical regions winter rainfall
régions tempérées	┴ ┴ ┴	temperate regions
durée de la période de croissance de type normal	～120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	～90	length of intermediate type of growing period
régions désertiques		desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants	～	main rivers and lakes
principales zones irriguées	═	main irrigated areas

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy



SIA

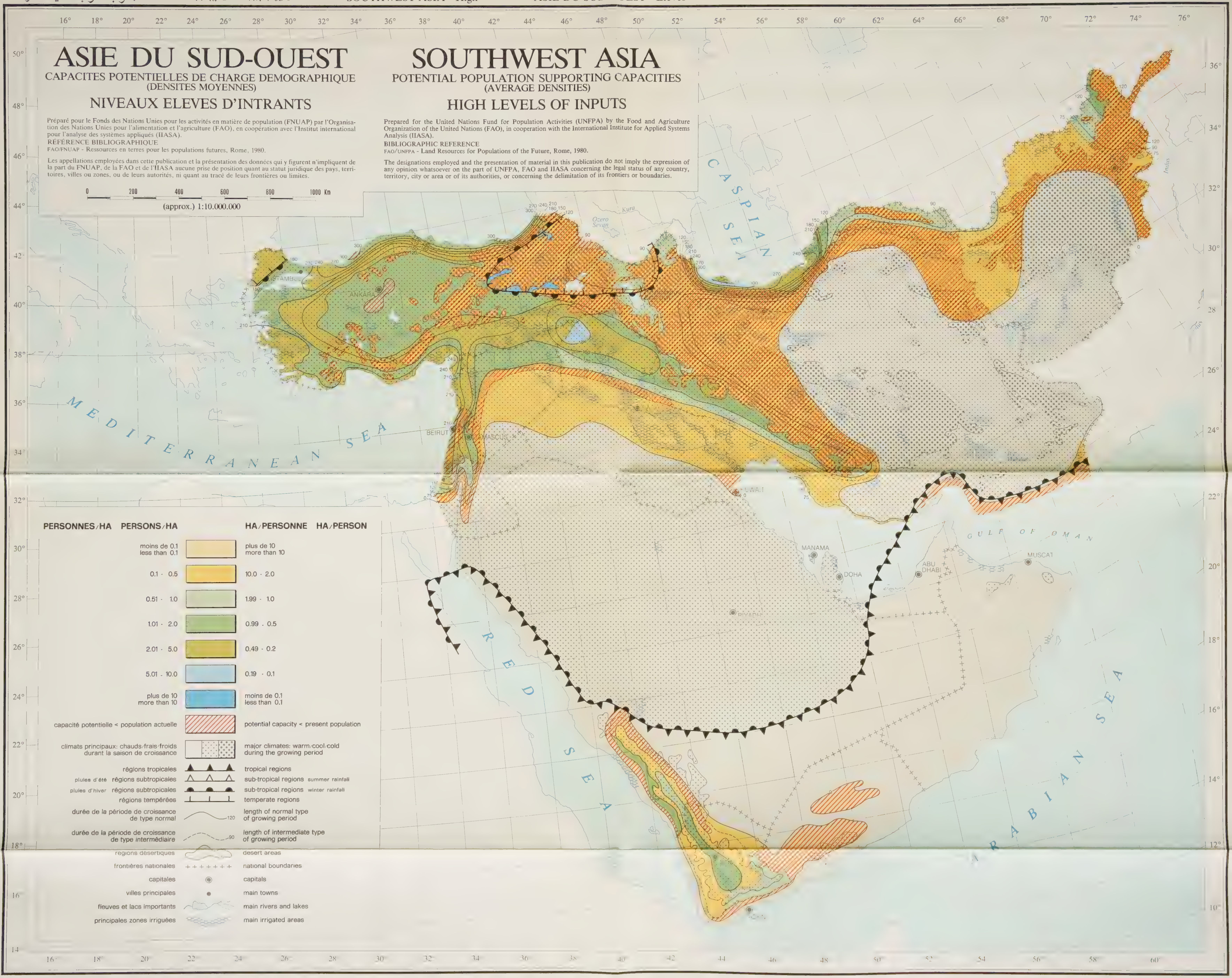
CAPACITIES

TS

he Food and Agriculture
titute for Applied Systems

ot imply the expression of
gal status of any country,
tiers or boundaries.

جنوب غرب آسيا ـ مرتفعة   西 南 亚 – 高水平投入   SOUTHWEST ASIA - High   ASIE DU SUD-OUEST - Elevés   SUDOESTE DE ASIA - Alto



ASIE DU SUD-OUEST

CAPACITES POTENTIELLES DE CHARGE DEMOGRAPHIQUE
(DENSITES MOYENNES)

NIVEAUX ELEVES D'INTRANTS

Préparé pour le Fonds des Nations Unies pour les activités en matière de population (FNUAP) par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO), en coopération avec l'Institut international pour l'analyse des systèmes appliqués (IIASA).

RÉFÉRENCE BIBLIOGRAPHIQUE

FAO/FNUAP - Ressources en terres pour les populations futures, Rome, 1980.

Les appellations employées dans cette publication et la présentation des données qui y figurent n'impliquent de la part du FNUAP, de la FAO et de l'IIASA aucune prise de position quant au statut juridique des pays, territoires, villes ou zones, ou de leurs autorités, ni quant au tracé de leurs frontières ou limites.

0 200 400 600 800 1000 Km

(approx.) 1:10.000.000

SOUTHWEST ASIA

POTENTIAL POPULATION SUPPORTING CAPACITIES
(AVERAGE DENSITIES)

HIGH LEVELS OF INPUTS

Prepared for the United Nations Fund for Population Activities (UNFPA) by the Food and Agriculture Organization of the United Nations (FAO), in cooperation with the International Institute for Applied Systems Analysis (IIASA).

BIBLIOGRAPHIC REFERENCE

FAO/UNFPA - Land Resources for Populations of the Future, Rome, 1980.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of UNFPA, FAO and IIASA concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

PERSONNES/HA PERSONS/HA		HA/PERSONNE HA/PERSON
moins de 0.1 less than 0.1	▭	plus de 10 more than 10
0.1 - 0.5	🟨	10.0 - 2.0
0.51 - 1.0	▭	1.99 - 1.0
1.01 - 2.0	🟩	0.99 - 0.5
2.01 - 5.0	🟨	0.49 - 0.2
5.01 - 10.0	▭	0.19 - 0.1
plus de 10 more than 10	🟦	moins de 0.1 less than 0.1
capacité potentielle < population actuelle	▨	potential capacity < present population
climats principaux: chauds/frais/froids durant la saison de croissance	□ ▒ ▓	major climates: warm/cool/cold during the growing period
régions tropicales	▲ ▲ ▲	tropical regions
pluies d'été régions subtropicales	△ △ △	sub-tropical regions summer rainfall
pluies d'hiver régions subtropicales	● ● ●	sub-tropical regions winter rainfall
régions tempérées	┴ ┴ ┴	temperate regions
durée de la période de croissance de type normal	~ 120	length of normal type of growing period
durée de la période de croissance de type intermédiaire	- - 90	length of intermediate type of growing period
régions désertiques		desert areas
frontières nationales	+ + + + + + +	national boundaries
capitales	◉	capitals
villes principales	●	main towns
fleuves et lacs importants		main rivers and lakes
principales zones irriguées		main irrigated areas

© FAO 1982

Cartography and printing: Stab. L. Salomone, Rome, Italy

Technical Report of Project *FPA/INT/513*

LAND RESOURCES FOR POPULATIONS OF THE FUTURE

338.191724
P847

POTENTIAL POPULATION SUPPORTING CAPACITIES OF LANDS IN THE DEVELOPING WORLD

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

UNITED NATIONS FUND FOR POPULATION ACTIVITIES

INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS

UNIVERSITY OF
ILLINOIS LIBRARY
AT URBANA-CHAMPAIGN
[redacted]

POTENTIAL POPULATION SUPPORTING CAPACITIES OF LANDS IN THE DEVELOPING WORLD

by
G.M. Higgins, A.H. Kassam and L. Naiken
Food and Agriculture Organization of the United Nations
and
G. Fischer and M.M. Shah
International Institute for Applied Systems Analysis

TECHNICAL REPORT
OF PROJECT INT/75/P13
'LAND RESOURCES FOR POPULATIONS OF THE FUTURE'

undertaken by
The Food and Agriculture Organization of the United Nations, Rome
in collaboration with
The International Institute for Applied Systems Analysis, Vienna
for
The United Nations Fund for Population Activities, New York

Rome 1982

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

M-04

ISBN 92-5-101411-6

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright owner. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Publications Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome, Italy.

© FAO 1983

CONTENTS

Page

SUMMARY *vii*

1. INTRODUCTION 1

1.1 Background 3
1.2 Prerequisites
1.3 Objectives and Scope 5

2. METHODOLOGY

2.1 The Overall Model and its Concepts 9

2.2 The Land Inventory

2.2.1 Climate 11
2.2.2 Soils 14
2.2.3 Land 17

2.3 Land For Rainfed Production 17

2.3.1 Non-agricultural Land Requirements 17
2.3.2 Rest (Fallow) Period Requirements 18
2.3.3 Irrigated Land Requirements and Production 20

2.4 Rainfed Production Potentials 21

2.4.1 Agro-climatic Suitability
2.4.2 Soil Suitability 22
2.4.3 Degradation 23
2.4.4 Allowances for Seed Requirements and Wastage Losses 25

2.5 Estimation of Potential Population Supporting Capacities

2.5.1 Crop Choice
2.5.2 Presently Grown Mixture of Crops 26
2.5.3 Potential Population Supporting Capacities 27

Page

3. FINDINGS 29

3.1 Regional Results 32

3.1.1 Present and Projected Population Densities

3.1.2 Present and Projected Potential Population Supporting Capacities 32

3.1.3 Comparison of Present (and Projected) Populations with Present (and Projected) Potential Population Supporting Capacities 33

3.2 Regional Growing Period Zone and Major Climate Results 35

3.2.1 Present Population Densities 35

3.2.2 Potential Population Supporting Capacities 37

3.2.3 Comparison of Present Populations with Present Potential Population Supporting Capacities 39

3.3 Individual-Country Growing Period Zone Results 40

3.4 Country Results 45

3.4.1 Present and Projected Population Densities 46

3.4.2 Present and Projected Potential Population Supporting Capacities 46

3.4.3 Comparison of Present and Projected Populations with Present and Projected Potentials 47

4. REVIEW AND IMPLICATIONS 51

Acknowledgements 58

References 59

FIGURES AND TABLES

Figure 1.1 Methodology 63

Figure 3.1 Presentation of Results: Levels of Aggregation 64

Figure 3.2 Populations and Potential Population Supporting Capacities of Five Regions in the Developing World 65

Figures 3.3 to 3.7 Present (Year 1975) Populations and Potential Population Supporting Capacities by Lengths of Growing Period Zones and Major Climates:

Figure 3.3 - Africa 67

Figure 3.4 - Southwest Asia 69

Figure 3.5 - South America 71

Figure 3.6 - Central America 73

Figure 3.7 - Southeast Asia 75

Page

Figure 3.8 Total Extent of Critical Individual-Country Length of Growing Period Zone Areas (Year 1975) 77

Figure 3.9 Populations and Potential Population Supporting Capacities of Countries in Africa 79-81

Figure 3.10 Populations and Potential Population Supporting Capacities of Countries in Southwest Asia 83

Figure 3.11 Populations and Potential Population Supporting Capacities of Countries in South America 85

Figure 3.12. Populations and Potential Population Supporting Capacities of Countries in Central America 87

Figure 3.13 Populations and Potential Population Supporting Capacities of Countries in Southeast Asia 89

Table 2.1 Distribution and Extent (million hectare) of Growing Period Zones by Major Climates in Five Regions of the Developing World 91

Table 2.2 Distribution and Extent (million hectare) of Major Soils, Phases, Textures and Slopes in Five Regions of the Developing World 92

Table 2.3 Present Crop Distribution (Rainfed and Irrigated) by Major Climate and Length of Growing Period Zone 83-99

Table 2.4 Present and Potential Populations and Contribution of Irrigation to Potential Population Supporting Capacity by Location and Level of Inputs 100-105

Table 3.1 Present and Projected Populations and Potential Population Supporting Capacities of Five Regions in the Developing World 106

Table 3.2 Present Population and Potential Population Supporting Capacities by Major Climate and Length of Growing Period Zone 107-112

Table 3.3 Extents and Populations of all Critical Individual-Country Length of Growing Period (LGP) Zone Areas by Major Climate and LGP Zone 113-133

Table 3.4 Present and Projected Populations and Potential Population Supporting Capacities by Location: Africa, Southwest Asia, South America, Central America and Southeast Asia 134-136

Table 3.5 Present and Projected Populations and Ratios to Present and Projected Population Supporting Capacities by Location: Africa, Southwest Asia, South America, Central America and Southeast Asia 137-139

SUMMARY

The report describes a methodology developed for the determination of physical potential 'population supporting capacities' of lands and records the results of application of the methodology, at a 1:5 million scale, to five regions of the Developing World. Three levels of inputs circumstances are used in the assessment and the potentials are compared with data on present and projected populations.

Population pressures are thus quantified and 'problem' areas delineated where land resources are insufficient to meet food needs. Such problem areas are designated as 'critical' areas and are defined in terms of their location and extent, and the magnitude of their excess population. The analysis, at its finest level of detail, is undertaken for individual-country length of growing period zones. Two time-frames are used in the study, namely the 'present' - as represented by base year 1975 data and the 'future' - as represented by year 2000 projected data.

The main conclusions of the study are:

- *The lands of the Developing World as a whole (excluding East Asia) are capable of producing sufficient food to sustain twice their year 1975 population and one and a half times their year 2000 population, even with low level of inputs. With application of intermediate level of inputs to all cultivable areas, these lands would be able to meet the food needs of more than four times their projected population of 2000 AD. These aggregated Developing World findings presuppose massive and unrestricted movement of surplus potential food production and labour within and between all five regions.*
- *At the other extreme, assuming no movement of surplus potential food production and labour between individual-country length of growing period zones, 2 453 million hectares - 38 percent of the total land area - are unable to produce sufficient food for their 1975 populations with low inputs. In these zones, no less than 1 165 million people - 60 percent of the total - were living on land resources able to sustain only 602 million people.*
- *A more realistic assumption is that of movement of surplus potential food production within countries. On this basis, 54 countries (out of the total of 117 studied) have insufficient land resources to meet the food needs of their 1975 populations with low level of inputs. The number of critical countries would rise to 64 by the year 2000 AD.*
- *Of these critical countries, for the year 2000, 28 would need to raise their inputs to at least intermediate level, on all their potentially cultivable land, if they are to meet food requirements from their own land resources. A further 17 would need to raise inputs to the high level to attain food self-sufficiency. Nineteen countries will be unable to meet their food needs, from national land resources, even with high level of inputs.*
- *Southwest Asia is the most critical region. With low level of inputs, fifteen out of sixteen countries cannot feed their present or expected populations from their own lands. In Africa, the year 2000 populations of 29 (out of 51) countries would exceed the physical potential population supporting capacity of their entire land resources with low level of inputs.*
- *Preliminary land degradation assessments indicate that, unless conservation measures are introduced on all cultivable land, 544 million hectares of potentially productive rainfed cropland - more than one-sixth of the total - could be lost.*

Objectives and assumptions

The present study offers, for the first time, a scientific assessment of the size of populations that the agricultural land resources of the developing countries studied can support. The results allow national and international policy makers to identify areas where land resources are insufficient to meet the food needs of their populations, as well as areas of surplus production potentials.

The potentials are calculated for three alternate levels of inputs circumstances, namely:

- *low level of inputs, assuming only land labour, no fertilizer and pesticide applications, no soil conservation measures and hence with full productivity losses arising from land degradation, and cultivation of the presently grown mixture of crops on all potentially cultivable rainfed lands;*
- *intermediate level of inputs, assuming the use of improved hand tools and/or draught implements, some fertilizer and pesticide application, some simple soil conservation measures lessening productivity losses from land degradation, and cultivation of a combination of the presently grown mixture of crops and the most calorie (protein) productive crops, on all potentially cultivable rainfed lands;*
- *high level of inputs, assuming complete mechanization, full use of optimum genetic material, necessary farm chemicals and soil conservation measures, and cultivation of only the most calorie (protein) productive crops on all potentially cultivable rainfed lands.*

The objective of the study has been simply to assess the physical potential of land resources to produce food. Factors limiting attainment of this physical potential, i.e. social, economic and institutional factors, are not included nor are land requirements for non-food crops and demands for diets above the minimum requirement level. The computed potentials provide a physical reference system and data base on which to superimpose all the different complex approaches needed to incorporate these and other factors.

Methodology

The methodology developed to compute the potentials initially determines crop specific rainfed production potentials through agro-ecological zone delineation and analysis, matching identified soil and climatic requirements of crops with soil and climatic inventories.

The climatic inventory takes into account both heat (major climates) and moisture conditions (lengths of growing period zones). Soil resources data is obtained from the 1:5 million FAO/Unesco Soil Map of the World, which is also used as the physical map base of the land inventory.

Overlay of the climatic inventory on the Soil Map allows creation of unique land areas within which soil and climatic conditions are known and quantified. Comparison of the inventoried climatic and soil attributes of land with crop requirements provides an assessment of the suitability of land for the rainfed production of crops.

The crops considered are among the most widely grown crops of the world and comprise pearl millet, sorghum, maize, rice, wheat, soybean, Phaseolus bean, sweet potato, white potato, cassava, groundnut, banana/plantain, sugarcane, oil palm and grassland/livestock.

Each area of the land inventory is analysed separately for these crops, and for grassland (livestock) production, to ascertain which crop(s) are the most productive under the unique soil and climatic conditions in the area. Prior to this analysis, deductions are made for land required for non-agricultural use, for irrigation and for rest period (fallow) requirements. Limitations imposed by degradation hazards and presently grown mixtures of crops, according to levels of inputs, are also taken into account.

The results of appropriate areas are totalled to arrive at calorie (protein) potentials for each country length of growing period zone. Once the maximum potential calorie (protein) production combination is ascertained, including the present and projected contribution from irrigated areas, application of FAO/WHO country specific per capita calorie (protein) requirements allows computation of the potential population supporting capacities of each zone in each country.

These assessments of potential population supporting capacities are finally compared with present (year 1975) and projected (year 2000) population data.

Results

First regional results of present and projected populations and potential population supporting capacities are presented and compared. This presupposes massive and unrestricted movement of surplus potential production and labour within regions (i.e. each region acting as a whole). On this basis, regional potential population supporting capacities are as follows:

For all regions in total, year 1975 potentials are 0.61, 2.11 and 5.05 person per hectare with low, intermediate and high levels of inputs respectively. Equivalent year 2000 potentials are 0.86, 2.30 and 5.11 person per hectare. The increased potentials are due to the increased irrigation production projected by the year 2000.

Differences within these total averages are large, reflecting regional variations in land resource endowment. With low level of inputs, the 1975 regional potentials range from a low of 0.16 person per hectare in Southwest Asia, to a high of 1.39 person per hectare in Southeast Asia; a more than eight-fold regional difference. Regional 1975 intermediate level of inputs potentials are 1.5 to 4.1 times greater than the low level of inputs potentials, being respectively 0.25 (Southwest Asia), 1.53 (Africa), 1.65 (Central America), 2.92 (South America) and 3.76 (Southeast Asia) person per hectare. High level of inputs regional potentials, for the same time-frame, are 2.5 to 9.7 times greater than the low, with South America showing the bigger increase.

Comparisons of these estimates, with data on present and projected populations, reveal that, given the assumptions of the study, the lands of the five regions as a whole could, even with low level of inputs, meet the food needs of 2.0 times the year 1975 population and 1.6 times the projected year 2000 population.

The regional (and total) ratios of projected populations to projected potentials (for the year 2000 with low level of inputs) are as follows: Southwest Asia 0.7; Southeast Asia 1.1; Central America 1.4; Africa 1.6; South America 3.5; overall average 1.6.

The exception to these potentially self-sufficient regional food situations is Southwest Asia where the ratios, for the year 2000, are 0.7, 0.9 and 1.2 at the low, intermediate and high levels of inputs respectively, i.e. this region (as a whole) will need to apply more than intermediate level of inputs to all its cultivable land, if it is to attain food self-sufficiency for its year 2000 projected population.

Within these described regional (and total) situations, however, there are very considerable extents of land which cannot meet the food requirements of their populations. The locations and extents of these areas, and the populations involved, are identified by the results of the finest unit of analysis of the study, i.e. the individual-country length of growing period zone results.

Under the presumption of each individual-country length of growing period zone acting as a single and independent entity, i.e. assuming no movement of surplus potential food production between zones, the extent of critical zones and the size of population exceeding the potential is large. With low level of inputs, an estimated 2 453 million hectares of land are assessed as being unable to meet the food needs of present (year 1975) populations. This critical extent is reduced to 1 434 million hectares with high level of inputs. Sizes of populations exceeding the potentials are estimated at 563, 176 and 102 million persons with low, intermediate and high levels of inputs respectively.

The extent of these critical areas is most marked in Southwest Asia where 75 percent (506 million hectares) of the total land area is assessed as critical with low level of inputs. Equivalent figures for other regions are: Africa - 47 percent (1 355 million ha); Southeast Asia - 35 percent (313 million ha); Central America - 25 percent (67 million ha) and South America - 12 percent (213 million ha).

Location of these critical individual-country length of growing period zones varies between regions. In general they are confined to lengths of growing period zones of less than 150/180 days in the warm tropics, but extend over most growing periods in the more densely populated moderately cool and cool tropics. The degree of criticality, i.e. the ratio by which population exceeds the potential population supporting capacity, is highest in these latter major climates where a considerable number of individual-country zones remain critical even with high level of inputs. The exception to this general picture is Southeast Asia where critical zones are widespread, with low level of inputs, in the longer lengths of growing period zones in the warm tropics.

Aggregation of the above described individual-country length of growing period zone results to the regional growing period zone level, emphasises the great effect of climatic (and soil) endowment on potential population supporting capacities. For the five regions in total, the highest average potentials occur in the warmer major climates of the tropics, subtropics and temperate regions, e.g. tropics: warm - 0.75 person per hectare; moderately cool - 0.16; cool - 0.12; and cold 0.05 person per hectare respectively with low level of inputs. Thus, overall, average potentials in the warm tropics are some six-fold greater than in the cool tropics.

Equally large variations in potential population supporting capacities also occur between lengths of growing period zones, grouped for all major climates. On average, over the five regions as a whole, the highest potentials occur in the longer length of growing period zones, i.e. more than 269 days, where potentials (with the low level of inputs circumstance) are in the range 0.82-1.58 person per hectare. The middle group of growing period zones, i.e. 90-269 days, have intermediate values (0.50-0.93 person per hectare) while the shorter lengths of growing period group (less than 90 days), with severe moisture limitations for crop growth, show the lowest potentials (i.e. 0.12-0.31 person per hectare). This pattern is particularly marked in those regions containing relatively small extents of irrigated lands, i.e. Africa, South America and Central America.

The report emphasises that these three sets of results, i.e. the regional results, the individual-country length of growing period zone results, and the regional growing period zone results, comprise three markedly contrasting degrees of aggregation and hence presuppose three markedly contrasting movement of surplus assumptions, namely:

- *within regions,*
- *within individual-country lengths of growing period zones,*
- *within regional lengths of growing period zones.*

A situation closer to present day reality is the assumption of movement of potential surplus within each country, i.e. each country acting as a single entity. The results of such a presumption are provided by the country aggregated results. These show that, at year 2000 and with the low level of inputs circumstance, 64 countries (out of a total of 117) will be unable to meet the food needs of their projected populations from their own land resources; 29 are in Africa, 15 in Southwest Asia, 14 in Central America and 6 in Southeast Asia.

At this low level of inputs circumstance, the total land area of critical countries is a massive 2 016 million hectares and the size of population exceeding the potential is 503 million people.

Even with application of intermediate level of inputs to all cultivable land, 36 countries will continue to be unable to meet the food needs of their year 2000 populations from their own land resources, (land area - 1 244 million hectares; excess population - 141 million). Nineteen of these countries (several of them small in extent) will be unable to meet future food needs even with high level of inputs (land area - 404 million hectares; excess population - 48 million).

In the report, an example is given on how the food deficits of critical countries can be met from adjacent countries with surplus potential production. This example suggests that, in general, the food deficit situation in most of the critical countries could be overcome by food imports from bordering or geographically adjacent countries.

The report concludes that while these results represent only a 'first approximation' of the overall physical situation, as revealed by interpretation of a 1:5 million scale land inventory, they do indicate the massive extent of the problem and some possible solutions.

For those areas that already carry more people than the land resources can support with high level of inputs, solutions involving population planning and distribution, major land improvements including irrigation and food importation (especially from adjacent countries with surplus production potentials) have to be considered. Without such remedies,continuation of the present situation in critical areas not importing food, can only lead to conditions worsening at an accelerated rate, through land degradation, declining productivity and hunger.

In areas where the situation is critical at low and intermediate levels of inputs, a further possibility is apparent, namely raising the level of inputs to attain additional production. The economics of this and of major land improvements, however, require careful investigation.

Within this context, the report emphasises that development action is, however, the result of social, economic and institutional policies in the context of all human, national and material resources. The study provides the estimate of the physical potential. Actual development will necessitate a whole set of integrated policies applied to all resources. The reported results provide, for the first time, a physical data base and reference system for the consideration of development requirements and options.

It is hoped that the report highlights the need for detailed country studies on production potentials and potential population supporting capacities of lands. Only with such studies will it be possible to provide the reference resource base required for planning adequately for the well-being of present and future population on a sound environmental basis. Within the limits of working means available, FAO hopes to have the opportunity to apply the experience gained in the present study and to assist in such work.

1. INTRODUCTION

1. INTRODUCTION

Man's demands for food, from the natural resources that sustain his very existence, have increased enormously in recent years. By year 2000 a world population of more than 6 billion will require an agricultural output some 50 to 60 percent greater than in 1980. Demand for food and agricultural products in Developing Countries will double (FAO, 1981).

'Are global land resources sufficient to achieve this increased production and feed future populations?', is a question of increasing world wide concern. 'Are country land resources sufficient to attain food self-sufficiency for our present and future populations?', is a question increasingly being asked by countries seeking self-reliance.

Answers to both questions are only possible by quantification of land resources and evaluation of their food production and population supporting potentials.

Such quantification and interpretation, at a 1:5 million scale, is attempted, for the Developing World (excluding East Asia) 1/, in the presently reported study.

1.1 Background

The ability of land to produce food is limited. The limits of production are set by soil and climatic conditions and the use and management applied to the land; 'mining' of land beyond these limits will, in the long term, only result in degradation and ever decreasing productivity.

Accordingly, there are critical levels of populations that can be supported, in perpetuity, from any given land area. Any attempts to produce food for populations in excess of the restrictions set by soil and climatic conditions will, in the long term, result in failure. Degradation of land, hunger and eventual reduction in population are the outcome of such practices.

Recognizing these facts within the context of a rapidly expanding world population, the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Fund for Population Activities (UNFPA), in collaboration with the International Institute for Applied Systems Analysis (IIASA), initiated project INT 75/P13 to determine the physical limits of population supporting capacities of lands.

1/ Countries studied are listed, by regions, in Table 3.4.

1.2 Prerequisites

That the study was even considered feasible, is due to no less than 20 years of prior work, undertaken mainly by the staff of the Soil Resources, Management and Conservation Service of FAO and cooperating 'soils' institutes and agencies throughout the world.

This effort resulted first, in the publication of the complete FAO/Unesco Soil Map of the World (FAO, 1971-1981). This work was undertaken primarily to overcome the lack of correlation that had hitherto characterized the field of soil mapping. Various countries had established their own nomenclature, survey methods and systems of classification. This made any comparison or exchange of information extremely difficult, with a very great risk of misunderstanding and practical error.

In a bid to remedy this state of affairs, FAO and Unesco, in 1961, agreed to prepare jointly, a soil map of the world, based on a synthesis of available soil survey material.

The secretariat was located at FAO headquarters in Rome. Its activities led gradually to the adoption of a common terminology and nomenclature acceptable to and understandable by all. With the help of soil specialists, national and private geographical institutes and governments, no less than 10 000 maps, reports and explanatory documents were collected and today these are filed and indexed at FAO headquarters. A large amount of first-hand information, provided by FAO staff carrying out field surveys for development projects, helped to fill in many of the gaps that became apparent. The work was finally completed in 1978 and made possible, for the first time, an appraisal of the world's soil resources in a common, internationally accepted, language (Dudal and Batisse, 1978).

Concurrently with the later stages of these activities, developments were also taking place in the field of interpretation of 'soils' information for assessing land suitability, and were aimed at developing an internationally acceptable standardized methodology for land evaluation.

By 1970, most countries of the world had developed their own particular systems of land evaluation. This, too, made interchange of information difficult and there was clearly a need for international discussion to achieve some form of standardization. The idea for such consultations was conceived in 1970, with the objective of developing a Framework for Land Evaluation that would be widely acceptable to survey and evaluation organizations and which would meet the needs of the widest range of possible users. Preparatory work for the consultation was undertaken, in the subsequent 24 months, by two multi-disciplinary committees, one in the Netherlands and one within FAO. The actual consultation was held at the International Agricultural Centre, Wageningen, in 1972. The consultation achieved a major step forward, by devising a Framework for Land Evaluation, into which national systems could fit. This Framework was first published in 1976 (FAO, 1976) and now forms the basis for many land evaluation activities throughout the developing and developed world. Some major principles are referred to on page 9.

The publication of the principles for land evaluation, at the time of completion of the Soil Map of the World, was opportune. Recognizing the importance of both activities, FAO applied the 'Principles' to the 'Map', to arrive at estimates of the extents of land variously suited to the production of specific crops in the Developing World. For the first time such estimates could be crop and level of input specific.

The results of this initiative was FAO's Agro-ecological Zones Project, a two-year study (1976-78) of potential land use by agro-ecological zones to provide quantified data on the production potential of the Developing World's land resources. Initially the project dealt with the rainfed production potentials, at two levels of inputs, for 11 main crops. The FAO/Unesco Soil Map of the World was used as the base for the study and most of the land evaluation principles, developed over the previous years, were applied. In essence the methodology employed determined the soil and climatic requirements of crops and matched these with soil and climatic inventories to arrive at estimates of crop potentials. An inter-disciplinary approach was adopted with collaboration from seven divisions within FAO. Publication of results commenced in 1978 with issue of the report for Africa and reports covering all regions are now available in the respective four volumes of World Soil Resources Report No. 48 (FAO, 1978-1981).

The issue of the Africa report in 1978 attracted the attention of (among others) the United Nations Fund for Population Activities (UNFPA). Specifically that Organization posed the question 'can the agro-ecological zone crop potential estimates be converted into estimates of potential population supporting capacities; if so, can these population potential estimates be compared with data on present and projected populations to identify critical areas where land resources are insufficient to meet food needs'.

The answer to both questions was 'yes' and led UNFPA to commission the presently reported project which is based, to a large extent, on the prerequisite activities started some 20 years previously.

.3 Objectives and Scope

The principle objectives of the study are, first, to ascertain on the basis of land resource inventories, the potential population supporting capacities of lands in the Developing World with various levels of inputs. And, second, to compare these estimates with data on present and projected populations in order to identify problem areas where land resources are insufficient to meet the food needs of populations at present (or projected to be) living on them and where action is urgently required to rectify this situation.

Subsidiary objectives of the study are to enhance awareness of the facts that land resources are very unevenly distributed between and within countries, that food production and population supporting potentials of land resources vary considerably within and between input systems, and that quantification of land resources and their potentials are essential prerequisites to the development of sound policies on agricultural and population planning.

It is hoped that the results will be used as an improved physical resource base for planning future population activities; will shed light on migration/land resource issues and will catalyze more detailed country studies, particularly in problem areas.

The project was commissioned by UNFPA in 1978. Originally two phases were envisaged namely:

a. 1:10 million scale studies of five regions in the Developing World (Phase I), and

b. 1:1 million scale studies in selected countries to develop and test refinements, of the methodology, for undertaking detailed studies in critical areas (Phase II).

Financial limitations necessitated restricting the project to Phase I activities only, under UNFPA financing. It is hoped to implement Phase II under UNEP or UN (Development and International Economic Co-operation) auspices and attempt quantification of the inter-relationships between resources, environment, population and development in the assessments.

The present technical report records the work and results of the UNFPA financed Phase I activities. Countries covered by the study are listed, by regions, in Table 3.4. Some small territories are excluded from the study, because of the very special nature of their environments. East Asia is not included in the study.

The work was undertaken within four Divisions in FAO, under the lead of the Soil Service of the Land and Water Development Division and in collaboration with the Food and Agriculture Program of IIASA. Activities of the project have been guided by two international expert panels. The first panel (December 1977) approved the proposed methodology. The second, (December 1979), deliberated the first results obtained (Africa) and gave the 'go-ahead' for proceeding with the remaining four continents (Southwest Asia, South America, Central America and Southeast Asia).

Reports on the two expert panel meetings and nine constituent consultants' papers, record progress of the study (FAO, 1978-80).

Activities and results of the project are recorded, in the present report, in four sections.

The COLOURED REGIONAL MAPS in the pocket display the 1975 time-frame potential population supporting capacities of each individual-country length of growing period zone and identify critical zones where present populations are in excess of the potential population supporting capacity at the stated levels of inputs. The results of each of the three input level assessments are shown separately, making a total of 15 coloured map sheets. Highlights of the maps are presented in the text.

The METHODOLOGY used to achieve these results is described in the section immediately following the introduction. The methodology is described as an aid to an appreciation of the results and as a guide to those wishing to apply it to the suggested more detailed national studies. While the concepts and principles of the methodology are scale neutral, more detailed data inputs are necessary for such detailed country work. The methodology section also contains data, necessary for the generation of the final results, on regional soils, climates, non-agricultural land use needs, fallow period requirements, land degradation and crop-mixes.

Aggregated total, regional and country results, for the 1975 time-frame and the year 2000 time-frame, are recorded in tabular and figure form at the end of the report. This data is summarized and interpreted in the FINDINGS section. In the findings section, comparisons of the potential population supporting capacity results, with present and projected population data, are effected for each country.

The final REVIEW section considers the findings in the light of present and projected population situations at the country level. The country results are also used to provide examples of the reduction in food deficits that can be obtained from movement of surplus potential production between countries grouped and functioning as a collaborating geographic entity. This is undertaken both for the present (year 1975) and future (year 2000) time-frames. This section also points to some policy implications at national and international levels. It is hoped to expand these implications in a 'final' report on the project.

2. METHODOLOGY

2. METHODOLOGY

The methodology developed by the project, to assess the potential population supporting capacities of lands, includes six principles which are fundamental to any sound evaluation of land. Namely:

i. land suitability is only meaningful in relation to a specific use, e.g. land suited to the cultivation of cassava is not necessarily suited to the cultivation of white potato;

ii. the evaluation of production potential is made in respect of specified levels of inputs, e.g. whether fertilizers are applied, if pest control is effected, if machinery or hand tools are used;

iii. suitability refers to use on a sustained basis, i.e. the envisaged use of land must not result in degradation, e.g. through wind erosion, water erosion, salinization or other degradation processes;

iv. evaluation involves comparison of more than one alternative type of land use, e.g. suitability for millet or sorghum or maize, and not just for one crop;

v. different kinds of land use are compared at least on a simple economic basis, i.e. suitability for each use is assessed by comparing the value of the produce to the cost of production;

vi. an inter-disciplinary approach is adopted, the evaluation being based on inputs from crop ecologists, agronomists, climatologists and economists, in addition to those from pedologists.

These principles are described in a "Framework for Land Evaluation" (FAO, 1976) and form an important part of the overall methodology.

2.1 The Overall Model and its Concepts

Figure 1.1 schematically illustrates the methodology developed to assess potential population supporting capacities, the block numbers in the figure relating to the step descriptions in the present section. The assessment is made for the three levels of inputs and associated circumstances defined overleaf. Each assessment considers 18 crops to ascertain maximum potential calorie production and hence potential population supporting capacities. The 18 crops considered are as listed, and are among the most widely grown crops of the world. The eighteenth crop, grassland, is used for the estimation of livestock potential.

Basic to the assessement is the land inventory (climate and soil) shown at the head of the flow chart (1). This inventory comprises overlay of a specially compiled climatic inventory onto the 1:5 million FAO/Unesco Soil Map of the World (FAO, 1971-81).

The Soil Map records the composition, location and extent of some 5 000 mapping units which are associations of soil units. The legend to the map is based on 26 major soil units, 106 soil units and 12 phases important to production management. The climatic inventory differentiates major climates (e.g. warm tropics) and lengths of growing period zones at 30 days intervals (e.g. 120-150 days).

Measurements of the unique land units resulting from this combination allows quantification of the land resources of countries in terms of soil and climatic conditions matched to the soil and climatic requirements of crops.

DEFINITION OF LEVELS OF INPUTS AND ASSOCIATED CIRCUMSTANCES

Crops of the assessment: pearl millet, sorghum, maize, rice, wheat, sweet potato, white potato, cassava, phaseolus bean, soybean, barley, oil palm, groundnut, banana/plantain, sugarcane, grassland

ATTRIBUTE	LOW INPUT LEVEL	INTERMEDIATE INPUT LEVEL	HIGH INPUT LEVEL
Production system	Rainfed cultivation of presently grown mixture of crops	Rainfed cultivation with part change to optimum mixture of crops	Rainfed cultivation of optimum mixture of crops
Technology employed	Local cultivars. No fertilizer or chemical pest, disease and weed control. Rest (fallow) periods. No long-term soil conservation measures	Improved cultivars as available. Limited fertilizer application. Simple extension packages including some chemical pest, disease and weed control. Some rest (fallow) periods. Some long-term conservation measures	High yielding cultivars. Optimum fertilizer application. Chemical pest, disease and weed control. Minimum rest (fallow) periods. Complete conservation measures
Power sources	Manual labour with hand tools	Manual labour with hand tools and/or animal traction with improved implements	Complete mechanization including harvesting
Labour intensity	High, including uncosted family labour	High, including part costed family labour	Low, family labour costed if used
Capital intensity	Low	Intermediate with credit on accessible terms	High
Market orientation	Subsistence production	Subsistence production plus commercial sale of surplus	Commercial production
Infrastructure requirements	Market accessibility not necessary. Inadequate advisory services	Some market accessibility necessary with access to demonstration plots and services	Market accessibility essential. High level of advisory services and application or research findings
Land holdings	Fragmented	Sometimes consolidated	Consolidated

The country land inventories consist of a number of agro-ecological cells, each quantifying the extent of each individual soil unit (broken down by phase, slope and texture class) as it occurs in each major climate and in each length of growing period zone.

Prior to the analysis of the inventory to ascertain maximum potential calorie production, deductions are made for land required for irrigation (2) and for non-agricultural use (3). The result of these deductions are country inventories of land available for rainfed cultivation (4). After selection of the input level to be assessed (5), each agro-ecological cell of the inventory (more than 35 000 cells for Africa) is analysed separately for all crops of the study to ascertain which use is most productive under the unique circumstances of the cells' soil and climatic conditions.

This is achieved by firstly applying major climate/crop temperature requirement rules (6) to ascertain 'suitable' crops, i.e. which crops can be considered further (7). Individual crop productivity rules (as determined for each major climate and each length of growing period zone) are then applied (8) to arrive at estimates of agro-climatic productivity (9). Subsequent application of limitations imposed by soil, phase, slope and texture (10), rest period requirements (11), degradation hazard (12) and seed and waste deductions (13), then allows computation of crop-specific land productivity potentials (14).

The next step in the methodology is application of calorie-protein conversion factors (15) to obtain calorie-protein production potentials of different crops. Selection of the crop giving the highest calorie production in each agro-ecological cell is then effected (16) and the results from all cells in each length of growing period zone are totalled to arrive at the maximum potential calorie-protein production from each length of growing period zone in each country (19). For the high and intermediate levels of inputs circumstances, a protein availability constraint at zone level is applied. For the low level of inputs, a constraint of retaining the presently grown mixture of crops (18) is included. Data on the presently grown mixture of crops, in each length of growing period, zone is derived from present land use inventories.

Once the maximum potential calorie production (with constraints) is determined for each length of growing period zone, application of country specific per capita calorie requirements (20) allows computation of the potential population supporting capacity in each length of growing period zone in each country (21). This data is presented as potential population densities (person per ha) and is compared with base (year 1975) population density data (22) to identify critical zones/countries where, according to the level of inputs envisaged, potential sustained production from land resources is insufficient to meet the food needs of the populations living in these areas. Country population projections for the year 2000 (23) - UN medium variant projections, are also compared with country potential population densities to identify critical countries, i.e. countries which will be critical with regard to food production for their future populations. At the scale of the assessment, it has not been possible to take into account existing or projected trade of food between countries.

Various aspects of the methodology are dealt with in more detail in the following sections.

2.2 The Land Inventory

2.2.1 Climate

The usefulness of a climatic inventory, for predicting agro-climatic suitability for crop production, is dependent on how far the climatic requirements of crops can be matched with the climatic parameters used in the inventory. Accordingly data on the climatic requirements of crops is an essential prerequisite to the compilation of a climatic inventory to be used for assessment of agro-climatic crop suitability.

To aid the compilation of such data on climatic requirements, crops can be classified into climatic adaptability groups according to their fairly distinct photosynthesis characteristics (Kassam, 1979a). Because crop adaptability is temperature dependent, prevailing temperature conditions determine which crop groups can be grown and which cannot and thus this climatic parameter is an essential component of any climatic inventory for crop suitability. Four such temperature related crop groups have been formulated (Kassam, Kowal & Sarraf, 1977).

Providing temperature requirements are met, the degree of success in the growth of a crop is largely dependent on how well its optimum length of growth cycle fits within the period when sufficient water is available for growth. Curtailment of the growth cycle is naturally reflected by decreased yield and the same is true for enforced extended growth cycles. Accordingly, under rainfed conditions, the time when water is available for crop growth is also of vital importance for any assessment of crop suitability. Provided this (with radiation and temperature data) is known, climatically potential crop yields, in suitable prevailing temperature regimes, can be quantified. Subsequent application of crop specific agro-climatic constraints (e.g. rainfall variability, pests, diseases, workability) as related to various environmental conditions, provides quantification of agro-climatically obtainable yields.

Recognizing these facts, the climatic inventory created by the study of necessity characterizes both heat and moisture conditions. This is achieved through the concept of the length of growing period, being defined as the duration (in days) when both water and temperature permit crop growth. A moisture supply from rainfall of half, or more than half, potential evapotranspiration has been considered sufficient to permit crop growth. Mean daily temperatures greater than 5°C have been considered as conducive to growth.

Quantification of the heat attributes, during the growing period, is achieved by classifying major climates defining the actual temperature regime during the growing period, as shown below.

CHARACTERISTICS OF MAJOR CLIMATES

Climate	Major Climates during Growing Period		24-hr Mean (daily) Temperature (°C) Regime during the Growing Period
	No	Descriptive Name	
Tropics All months with monthly mean temperatures corrected to sea level, above 18°C	1	Warm tropics	More than 20
	2	Moderately cool tropics	15 - 20
	3	Cool tropics	5 - 15
	4	Cold tropics	Less than 5
Sub-tropics One or more months with monthly mean temperatures, corrected to sea level, below 18°C but all months above 5°C	5	Warm/moderately cool sub-tropics (summer rainfall)	More than 20
	6	Warm/moderately cool sub-tropics (summer rainfall)	15 - 20
	7	Warm sub-tropics (summer rainfall)	More than 20
	8	Moderately cool sub-tropics (summer rainfall)	15 - 20
	9	Cool sub-tropics (summer rainfall)	5 - 15
	10	Cold sub-tropics (summer rainfall)	Less than 5
	11	Cool sub-tropics (winter rainfall)	5 - 20
	12	Cold sub-tropics (winter rainfall)	Less than 5
Temperate One or more months with monthly mean temperatures, corrected to sea level, below 5°C	13	Cool temperate	5 - 20
	14	Cold temperate	Less than 5

The temperature thresholds, used in these definitions, accord with those differentiating the four major crop groups and therefore allow matching of the temperature requirements of the crops with the temperature parameters used in the climatic inventory. In this way the groups of crops which can be considered as 'possible' for growth in the different major climates are identified.

Quantification of moisture conditions in the growing period is based on a water balance model comparing precipitation (P) with potential evapotranspiration (PET) and allowing for up to a 100 mm of soil moisture storage. Areas that have a humid (P>PET) during the growing period, are inventoried separately from those that do not; the former are designated as 'normal', the latter as 'intermediate'. Variations in moisture conditions are taken into account in subsequent computation of agro-climatically attainable crop yields.

The data utilized for compilation of the climatic inventory and for other further climate-related calculations, comprise meteorological records from 3 500 stations where extended data on rainfall, maximum and minimum temperatures, vapour pressure, wind speed and sunshine duration is available on a monthly basis (AGP Climatic Data Bank).

The climatic inventory of lengths and types of growing periods, by the major climates recognized, was undertaken on the 1:5 million FAO/Unesco Soil Map of the World by:

- plotting the individual station values of the lengths of growing periods;
- constructing isolines of growing periods with values of 0, 75, 90, 120, 150, 180, 210, 240, 270, 300, 330, 365^-, 365^+ days, delineating length of growing period zones of 0-74 days, 75-89 days, 90-119 days, etc.

Areas with year-round humid period are designated as 365^+ days whereas areas with year-round growing period are designated as 365^- days.

Areas with 'normal' growing periods are delineated by continuous lines, while those with 'intermediate' growing periods are distinguished with broken lines. Where station data were limited, rainfall information and land use maps provided guidance for the isoline construction.

This 1:5 million inventory was reduced to 1:10 million to form the base for the potential population supporting capacity maps which accompany this report.

The distribution and extents of grouped lengths of growing period zones and major climates, in five regions of the Developing World (and in total), is presented in Table 2.1 and in full in Table 3.2. A generalized interpretation of this data (overleaf) reveals the following regional (and total) distribution of dominant climatic conditions for agriculture.

The data shows that, climatic resource endowment varies considerably between regions. South America contains the highest percentage of long growing periods (65.7 percent) followed by Southeast Asia (52.1 percent), Central America (40.4 percent) and Africa (33.6 percent). Only 3.3 percent of Southwest Asia benefits from conditions of long growing periods.

Dry desert conditions prevail over more than half of Southwest Asia (54.6 percent) and over nearly one-third of Africa (29.4 percent). Year-round humid conditions with excess rainfall are most prevalent in Southeast Asia (9.6 percent) and South America (6.8 percent).

DOMINANT REGIONAL CLIMATES

(extent - million hectare)

	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	TOTAL
COLD (severe temperature constraints)	9.1 (0.3)	113.7 (16.8)	60.8 (3.4)	0.7 (0.3)	47.7 (5.3)	232.0 (3.6)
WARM/COOL (no severe temperature constraints)						
- Dry (0 days)	846.7 (29.4)	369.7 (54.6)	81.2 (4.6)	35.6 (13.1)	39.2 (4.4)	1 372.4 (21.1)
- Inadequate growing periods (1-74 days)	487.9 (17.0)	72.6 (10.7)	114.6 (6.5)	62.2 (22.9)	54.6 (6.1)	791.9 (12.2)
- Short growing periods (75-179 days)	545.4 (19.0)	98.9 (14.6)	230.4 (13.0)	63.2 (23.3)	201.9 (22.5)	1 139.8 (17.5)
- Long growing periods (180-365^- days)	969.2 (33.6)	22.5 (3.3)	1 163.5 (65.7)	109.9 (40.4)	467.8 (52.1)	2 732.9 (42.1)
- Year-round humid (365^+ days)	19.8 (0.7)	-	119.7 (6.8)	-	86.4 (9.6)	225.9 (3.5)
Total	2 878.1	677.4	1 770.2	271.6	897.6	6 494.9

Figures in parenthesis are percentages of regional Totals.

Summing the areas which are climatically suitable for rainfed crop production (i.e. short, long and year-round humid growing periods with no severe temperature constraints) reveals the following increasing order of benefit in climatic resource endowment.

Southwest Asia - 17.9 percent
Africa - 53.3 percent
Central America - 63.7 percent
Southeast Asia - 84.2 percent
South America - 85.5 percent.

More than 80 percent of Southwest Asia is climatically not suitable for rainfed crop production. In contrast more than 85 percent of South America is climatically suitable for rainfed crop production.

2.2.2 Soil

The 1:5 million FAO/Unesco Soil Map of the World (FAO, 1971-81) is used as the base for the study, not only for provision of soil, slope, texture and phase data but also as the physical map base of the land inventory. Certain attributes of this soil inventory are particularly pertinent to the land inventory and are, accordingly, described.

The legend of the Soil Map of the World comprises 106 different soil units, (26 major soil units), and the symbols and names of the major units are reproduced below.

J Fluvisols
G Gleysols
R Regosols
I Lithosols
B Cambisols
L Luvisols
Q Arenosols
E Rendzinas
U Rankers
T Andosols
V Vertisols
D Podzoluvisols
P Podzols
W Planosols
Z Solonchaks
S Solonetz
Y Yermosols
X Xerosols
A Acrisols
N Nitosols
F Ferralsols
K Kastanozems
C Chernozems
H Phaeozems
M Greyzems
O Histosols

The mapping units employed in the Soil Map are associations of soil units and are usually composed of a dominant soil and of associated soils. Each of the latter occupies at least 20 percent of the area of a mapping unit; important soils which cover less than 20 percent of the area of a mapping unit are inventoried as inclusions. The composition and extent of each soil association is given on the reverse of each respective map sheet and in the explanatory texts of the map.

In the mapping unit symbol of the soil associations, textural class, slope class and phase (if present) are described as follows:

The textural class applies to the dominant soil and three textural classes are differentiated, namely:

1 - coarse textured,

2 - medium textured,

3 - fine textured.

Three slope classes are distinguished. They indicate the slope which dominates the area of the mapping unit and are labelled, in the mapping unit symbol, by the letters a, b or c. The three slope classes are:

a - level to gently undulating; dominant slopes ranging between 0 and 8 percent

b - rolling to hilly; dominant slopes ranging between 8 and 30 percent

c - steeply dissected to mountainous; dominant slopes are greater than 30 percent.

Phases indicate land characteristics which are not reflected by the composition of the soil associations but are significant to the use or management of the land. The 12 phases recognized are: stony, lithic, petric, petrocalcic, petrogypsic, petroferric, phreatic, fragipan, duripan, saline, sodic and cerrado.

The distribution and extent of the most extensive major soil units, in five regions of the Developing World, is presented in full in Table 2.2 together with the distribution and extent of soil phases, texture classes, slope classes and miscellaneous land units. A generalized interpretation of this data (overleaf), reveals the following regional (and total) distribution of soil conditions for agriculture.

Twenty-one (21.4) percent of the total area of the five regions comprises soils with no inherent fertility limitations, while the remainder of the area (78.9 percent) consists of soils with some kind of limitations, e.g. poor drainage (6.5 percent) shallow depth (14.0 percent). The individual regions vary considerably in their soil resource endowment: Central America and Southeast Asia contain the highest percentages of soils with no inherent fertility limitations (43.8 and 36.2 percent respectively) followed by South America (20.3 percent), Africa (18.6 percent) and finally Southwest Asia (7.6 percent).

The major kind of limitation, in the remaining area, varies between regions. The major soil limitations in Africa are coarse textures (19.7 percent), desert soil conditions (16.0 percent) and fertility (14.6 percent). Desert soil conditions and coarse textures are also main limitations in Southwest Asia comprising 34.1 percent and 18.7 percent respectively of the total area; shallow depth (26.6 percent) and salinity/alkalinity (7.9 percent) are also important soil limitations in this region. The Central America region is not dissimilar, with shallow depth (22.3 percent) and desert soil conditions (11.7 percent) comprising the main limitations.

In contrast the moister Southeast Asia and South America regions exhibit a different order of occurrence of main soil limitations, namely fertility limitations (24.5 and 40.8 percent respectively), shallow soil depth (11.0 and 10.9 percent) and poor drainage (8.4 and 10.2 percent).

These soil limitations exert a considerable influence on the regional potentials for rainfed crop production.

DOMINANT REGIONAL SOILS

(extent-million hectare)

	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	TOTAL
Soils with no inherent fertility limitations (T,C,B,J,R,L,H,N, D, K)	535.2 (18.6)	51.5 (7.6)	359.8 (20.3)	118.9 (43.8)	324.4 (36.2)	1 389.8 (21.4)
Soils with severe fertility limitations (A,F,P)	419.1 (14.6)	2.1 (0.3)	722.3 (40.8)	16.2 (6.0)	219.9 (24.5)	1 379.6 (21.6)
Heavy cracking clay soils (V)	98.8 (3.4)	5.7 (0.8)	24.9 (1.4)	13.2 (4.9)	57.9 (6.5)	200.5 (3.1)
Salt affected soils (Z,S)	64.3 (2.2)	53.2 (7.9)	56.5 (3.2)	2.3 (0.8)	20.0 (2.2)	196.3 (3.0)
Poorly drained soils (G,O,W)	152.9 (5.3)	2.6 (0.4)	179.9 (10.2)	12.7 (4.7)	75.8 (8.4)	423.9 (6.5)
Shallow soils (I.U,E)	376.3 (13.1)	180.4 (26.6)	193.6 (10.9)	60.6 (22.3)	98.7 (11.0)	909.6 (14.0)
Coarse textured soils (Q,R)	567.5 (19.7)	126.9 (18.7)	132.4 (7.5)	15.9 (5.8)	52.3 (5.8)	895.0 (13.9)
Semi-desert & desert soils (X, Y)	459.2 (16.0)	230.9 (34.1)	93.9 (5.3)	31.8 (11.7)	42.7 (4.8)	858.5 (13.2)
Miscellaneous land units	204.8 (7.1)	24.1 (3.6)	6.9 (0.4)	-	5.9 (0.6)	241.7 (3.7)
Total	2 878.1	677.4	1 770.2	271.6	897.6	6 494.9

Figures in parenthesis are percentages of Totals.

Letters in parenthesis are the major soil symbols referred to previously.

Some soils exhibit several of the above listed characteristics and only the main limitation has been considered in the above generalized interpretation.

2.2.3 Land

Overlay of the climatic inventory on the Soil Map, allows creation of unique land units within which soil and climatic conditions are known and quantified. After compilation of this land inventory map, the area of each soil mapping unit is measured as it occurs in each length of growing period zone, in each major climate and in each country. This measurement is achieved by a 2 mm (100 km^2) grid count corrected for reported areas of countries' land masses. The data is used, as follows, to create the computerized land inventory of extents of soil units, by slope and texture classes and phase (where present), as they occur in each length of growing period zone, in each major climate and in each country (i.e. the agro-ecological cells):

The first stage of the computer program records the extent and composition of each mapping unit according to the listings given in the appropriate texts of the Soil Map. This data is then sorted by countries in the form of 'turn-around' documents, for entry of the areas of each mapping unit by length of growing period zone and major climate as obtained from the grid count.

The second stage of the program converts this basic data input into individual extents of each soil unit in each mapping unit, by slope and texture classes and phase, as they occur in each length of growing period zone and in each major climate at the country level.

The third and final stage of the program provides total extents of each soil unit broken down by texture class, slope classes and phase as they occur in each major climate and in each length of growing period zone on a country basis.

Such is the computerized land inventory compiled and used in the study.

2.3 Land For Rainfed Production

Not all the inventoried land is available for rainfed agricultural production. Land requirements for non-agricultural use, rest (fallow) periods and for irrigation, need to be taken into account, before rainfed production potentials can be calculated on an annual basis. In the study, such land requirements have been estimated as follows:

2.3.1 Non-agricultural Land Requirements

Requirements for land, other than for agricultural purposes, include areas for habitation, communications, industry, mining, conservancy and recreational use. These non-agricultural land requirements are essential to the functioning of communities, and are dictated not only by the desires of populations, but also by environmental conditions, population pressures and land use practices. Extreme cases reveal variations from near zero to 33 percent in the proportion of total land area devoted to non-agricultural use. Such requirements must be taken into account in computing production potentials and potential population supporting capacities of land areas.

A detailed land use study of a large scale irrigated area in Malaysia (Wong, 1977) reveals a per-capita non-agricultural land requirement of 0.05 hectare under such land use conditions.

In the USA, per-capita non-agricultural land needs range from 0.25 hectare in the New England area to 0.03 hectare in the area served by New York City (Spaulding and O'Heady, 1977).

Work by the Holcomb Research Institute (Hyde et al., 1980) during the course of the project, analysed (from Landsat MSS data) the extent of potentially cultivable land currently occupied by habitation in seven test sites (each of 3 422 thousand hectare) in Africa. Interpretation of the results, revealed a per-capita land requirement varying from 0.001 hectare per person in humid areas of Nigeria/Cameroon to 0.024 hectare per person in sub-humid areas of Kenya with high population densities.

More recent work (FAO/UNDP, 1981), in Bangladesh, studied changes in settlement and related non-agricultural land use over seven sites totalling 146 000 hectares. Results of the study showed remarkable little expansion (7.7 percent) of settlements and related non-agricultural land use between 1952 and 1974, despite a population increase of 58 percent. The study concluded that the additional population had been absorbed almost entirely within existing settlement areas but that these were now fully occupied and any further increase in population must be housed by settlement expansion onto agricultural land.

The study determined that, in the 1950's the range in per-capita non-agricultural land requirements was 0.014 to 0.054 hectare, an average of 0.027 hectare. In 1974 the average was 0.018 hectare.

In view of the considerable diversity in the per-capita requirement figures from these studies, recourse has been made, in the study, to the limited national statistical returns on extents of non-agricultural land per country.

Returns from 41 countries have been compiled by FAO (Zarqa, 1981) and reveal an average per-capita figure of 0.056 hectare as the extent of 'built on' area over these countries as a whole. Individual country figures vary from an exceptional low of 0.044 hectare in Uganda to highs of 0.080 hectare in Columbia and 0.078 hectare in New Zealand. Little increase in 'built on' area is reported between the years 1970 to 1980.

Consideration of the above information indicates that there is, at present, insufficient data to allow application of land resource specific per-capita 'non-agricultural land requirement' estimates. Accordingly, a figure of 0.05 hectare per person has been used in the study. This value accords to: the average of country returns on 'built on' areas, the 'medium' USA figure of Spaulding and O'Heady, and the derived estimates of Wong.

Application of this value to regional land areas and populations, provides the following estimates (overleaf) of extents of non-agricultural land requirements, per region, for the years 1975 and 2000.

In the analysis of potential population supporting capacities, the non-agricultural land requirement value of 0.05 hectare per person, is multiplied by the base year 1975 (and year 2000) country population data. The results are computed as a percentage of total country land area, and the equivalent extents of land are then deducted from all entries in the land inventory before analyses of crop production potentials are initiated.

ESTIMATES OF NON-AGRICULTURAL LAND REQUIREMENTS

REGION		AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	TOTAL
Total area (10^6 ha)		2 878.1	677.4	1 770.2	271.6	897.6	6 494.9
1975 POPULATION (10^6 person)		380.2	136.3	215.8	106.6	1 117.7	1 956.6
2000 POPULATION [1] (10^6 person)		780.1	264.7	392.6	215.2	1 937.1	3 589.7
Non-agric. land requirements (10^6 ha)	1975	19.0	6.8	10.8	5.3	55.9	97.9
	2000	39.0	13.2	19.6	10.8	96.9	179.5
Percent of Regional Area	1975	0.7	1.0	0.6	2.0	6.2	1.5
	2000	1.4	1.9	1.1	4.0	10.8	2.8

[1] UN Medium Term Variant

2.3.2 Rest (Fallow) Period Requirements

In their natural state, many soils cannot be continuously cultivated with annual food crops without undergoing some degradation. Such degradation is marked by a decrease in crop yields and a deterioration in soil structure, nutrient status and other physical, chemical and biological attributes.

Under traditional farming systems, this deterioration is kept in check by alternating some years of cultivation with periods of rest (fallow) when the land is allowed to revert back to 'natural vegetation'. This practice of bush fallow rotation or shifting cultivation restores the nutrient status, improves soil physical and chemical conditions, controls weeds, pests and diseases, reduces erosion and, in arid areas, augments soil moisture status (Young and Wright, 1980). The extent of the necessary rest period is dependent on the level of inputs, soil and climatic conditions and crops.

Accordingly, account must be taken of the duration of the rest period in computing land productivity and potential population supporting capacities. Some examples of rest period requirements of major soils under various climates, according to different levels of inputs circumstances, as determined by Young and Wright (1980) and used in the study, are presented overleaf.

The importance of the rest period requirement, in determining potential population supporting capacities, is evident. With low level of inputs in the humid tropics, cultivation of Arenosols land is only possible one year out of ten if productivity is to be maintained and land degradation avoided. In contrast, Gleysols land may be cultivated 6 years out of 10 with the same level of inputs and climatic circumstances.

REST PERIOD REQUIREMENTS (CULTIVATION FACTORS) 1/ FOR SOME MAJOR SOILS IN THE TROPICS ACCORDING TO LEVEL OF INPUTS

Major Soil Unit	Low Inputs		Intermediate Inputs		High Inputs	
	Humid 2/	Semi-arid 3/	Humid	Semi-arid	Humid	Semi-arid
Arenosols	10	20	30	45	50	50
Ferralsols	15	20	35	40	70	75
Acrisols	15	20	40	60	65	75
Luvisols	25	35	50	55	70	75
Cambisols	35	40	65	60	85	80
Nitosols	40	75	55	70	90	90
Vertisols	40	45	70	75	90	90
Gleysols	60	90	80	90	90	90

1/ The cultivation factor is the number of years in which it is possible to cultivate the land, as a percentage of the total cultivation and non-cultivation cycle.

2/ Humid - more than 269 days of growing period.

3/ Semi-arid - less than 120 days of growing period.

2.3.3 Irrigated Land Requirements and Production

Production from irrigated areas is an important component of national agricultural production, particularly in arid and semi-arid areas. Accordingly both the extent of land under current and projected irrigation and the production therefrom, need to be taken into account in assessment of potential population supporting capacities.

Data on base year and projected crop specific irrigation production and extents of base year and projected irrigated land, by countries, are recorded in FAO (1981).

This data has been used in the present study to take the necessary account of: a) land required for irrigation and b) irrigation production.

The location of such lands, in relation to the compiled land resource inventory, was mainly effected by satellite image interpretation and national irrigation source material. Where such data were insufficient to identify the location of all recorded irrigated land, the unlocated balance was allocated to the resource inventory by means of a sub-model (Wood, 1980) matching land resource attributes with crop specific irrigation requirements. This identified areas where the unlocated balance of irrigated land was most likely to occur. The model also provided the basis for allocation of envisaged expansion in irrigated areas and production by year 2000. In quantifying irrigated production (base year and year 2000), produce from non-food crops was converted to grain equivalents by crop substitution.

In the overall model, extents of irrigated land (for the two time-frames) are deducted from appropriate identified entries of the land resource inventory. Corresponding irrigated food production is allocated to the same entries, for later incorporation to allow quantification of total potential rainfed, and irrigated, production (Section 2.5.3).

2.4 Rainfed Production Potentials

The physical production potential of any land area, under a given set of input circumstances, is determined by soil and climatic conditions and by the crop(s) grown. The four main components used in the study to quantify rainfed agricultural production potentials are: agro-climatic suitability, soil suitability, degradation, seed requirements and wastage losses. Accordingly, the assessment of physical production potentials quantifies the influence and contribution from each of these components, as described below.

2.4.1 Agro-climatic Suitability

For every crop that can be grown in an area, there is an optimum agro-climatic yield potential dictated by climatic conditions. In areas where multiple cropping (sequential and intercropping) is possible, total productivity potential, as opposed to single crop yields, must be assessed. Some of the agro-climatic yield and production potentials determined (Kassam 1979b) for main crops in selected major climates and lengths of growing period zones, taking into account multiple cropping, are shown below.

EXAMPLES OF RAINFED CROP YIELDS AND PRODUCTIVITY UNDER VARIOUS CLIMATIC CONDITIONS (TONNES PER HECTARE DRY WEIGHT) - LOW INPUT LEVEL

Major Climate and Length of Growing Period Zone (days)	CROP			
	Pearl millet	Wheat	Cassava	White potato
Warm Tropics				
75-89	0.3 (0.4)	NS	0.1 (0.1)	NS
150-179	0.8 (1.7)	NS	0.9 (1.0)	NS
270-299	0.1 (0.2)	NS	2.3 (3.0)	NS
365⁻	0.1 (0.2)	NS	1.9 (2.5)	NS
Cool Tropics				
75-89	NS	0.1 (0.1)	NS	0.3 (0.4)
150-179	NS	1.1 (1.5)	NS	1.8 (3.1)
270-299	NS	0.2 (0.3)	NS	0.5 (1.2)
365-	NS	0.2 (0.3)	NS	0.2 (0.3)
Cool Sub-tropics (winter rainfall)				
75-89	NS	0.1 (0.1)	NS	NS
150-179	NS	0.9 (1.0)	NS	NS
270-299	NS	0.8 (0.9)	NS	NS

Figures in parenthesis refer to productivity, including increments due to multiple cropping.

The table shows the variations in yield and productivity according to climatic conditions and crop. NS entries indicate that the crop is not suitable (for production) in the major climates considered, because the crop's temperature requirements are not fully met by the prevailing temperature regime. Agro-climatic constraints of pests, diseases, weeds, workability and rainfall variability have been considered in arriving at these potentials, as have increases in productivity from sequential and intercropping vis-a-vis production from sole cropping.

The data shows crop yields and productivity for the low level of inputs circumstances. Productivity data for intermediate and high input levels are two-fold to four-fold greater.

2.4.2 Soil Suitability

Agro-climatic potential yield and productivity is dictated by climatic conditions. Soil conditions modify these agro-climatic potentials and determine attainable land productivity potentials.

Soil conditions vary as widely as climatic conditions and can have a great influence on agro-climatic potentials. Many instances occur where major soil constraints completely override climatic potentials, turning what may be high climatic potential areas into non-productive land. Examples of such soil limitations are shallow depth, poor drainage and salinity. Some soil limitations (e.g. shallow depth) affect all crops, while others (e.g. poor drainage) are more crop specific. Examples of some of the crop-specific soil limitation ratings (for main soils), formulated (Sys and Riquier, 1980) and used in the study,are shown below.

EXAMPLES OF CROP SPECIFIC SOIL LIMITATION RATINGS

MAJOR SOIL	LIMITATION RATINGS FOR GROWTH OF:				
	Pearl millet	Maize	Wheat	Cassava	White potato
Lithosols (shallow soils)	NS	NS	NS	NS	NS
Ferralsols (leached acid soils)	S2	S2	S2	S2	S2
Yermosols (desert soils)	NS	NS	NS	NS	NS
Acrisols (lateritic soils)	S2	S2	S2	S2	S2
Arenosols (sandy soils)	S2	NS	NS	S2	S2
Luvisols (base saturated soils)	S1	S1	S1	S1	S1
Cambisols (weakly developed soils)	S1	S1	S1	S1	S1
Gleysols (hydromorphic soils)	NS	NS	NS	NS	NS

NS = Major limitations, making soil not suitable for production of the specified crop.

S2 = Moderate limitations, markedly affecting the agro-climatic productivity potentials

S1 = No or slight limitations,not affecting the agro-climatic productivity potentials.

2.4.3 Degradation

In addition to the described effects of climatic and soil resources on productivity, these two factors (climate and soil) also greatly influence the rate of land degradation, particularly when the land is improperly used. Such degradation results in decreased productivity and these reductions (in productivity) must be taken into account in reliable assessments of sustainable production potentials at various levels of inputs.

Land degradation refers to the partial or total loss of productivity resulting from processes such as soil erosion/soil loss by water or wind, salinization and alkalinization, waterlogging, depletion of plant nutrients/organic matter, deterioration of soil structure, and pollution (FAO/UNEP/Unesco, 1979).

In the present study, the effects of water and wind erosion are directly applied in assessing land potentials. This has been achieved by developing and applying a methodology for estimating, level of input specific, rates of soil loss under the specific climatic, soil and land use circumstances used in the assessment. These rates are then interpreted in terms of anticipated productivity decreases (Arnoldus, 1980).

The methodology used, for estimating rates of soil loss, is a parametric approach using climatic (rainfall and wind erosivity indices), soil, topographic, texture and vegetation/land use factors. Prior to the present study, regional assessments of soil loss were not possible because of the lack of a suitable climatic, soil, slope, texture and land use quantification on which to base the assessment.

Subsequent to this achieved quantification however, there remained a wide gap in ways to translate calculated rates of soil loss into decreases in potential productivity (Marsh, 1980). Efforts to reduce this gap (Higgins and Kassam, 1981) are being worked on by the Food and Agriculture Organization of the United Nations and the International Institute for Applied Systems Analysis and results are to be published early in 1983. In the interim, however, the following relationships have been employed in the present study.

RELATIONSHIPS BETWEEN SOIL LOSS AND DECREASES IN PRODUCTIVITY

Rate of Soil Loss (tonnes per ha per annum)	Anticipated Long-Term Productivity Losses
less than 12	No change in land productivity
12 - 15	50 percent of the area of very productive land downgrades to productive land; the remainder remains unchanged
51 - 100	100 percent of all productive land downgrades by one productivity class
101 - 200	50 percent of the area of all productive land downgrades to not suitable (non-productive land); the remainder downgrades by one productivity class
more than 201	All extents of productive land downgrades to not suitable (non-productive land)

In the present study, the appropriate decreases in productivity (corresponding to the computed rates of soil loss) are applied after other factors governing productivity are taken into account (Fig. 1.1). The decreases are applied to all land found to be at least marginally productive.

Because rates of soil loss are directly related to level of inputs circumstances (page 10) i.e.

a. low level of inputs - no conservation measures (full rate of soil loss)

b. intermediate level of inputs - some conservation measures (50 percent rate of soil loss)

c. high level of inputs - complete conservation measures (acceptable soil loss)

the corresponding decreases in productivity also vary by level of input circumstances.

Accordingly, quantification of the effects of unchecked (full rate of soil loss) soil erosion on long-term productivity is only possible using the low level of inputs' circumstance results. 'Holding' the same set of crops in 'with' and 'without' degradation runs of the model (with low level of inputs) provides the following regional quantifications of the effect of unchecked soil erosion on productivity.

EFFECTS OF UNCHECKED SOIL EROSION ON PRODUCTIVITY

	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	TOTAL
Decrease in area of rain-fed cropland (percent)	16.5	20.0	9.7	29.7	35.6	17.7
Decrease in rainfed crop productivity (percent)	29.4	35.1	22.6	44.5	38.6	28.9
Decrease in total land productivity (percent)	24.9	4.9	20.6	24.6	12.4	18.5

The results are striking. Over the five regions as a whole, the area of potential rainfed cropland reduces by 17.7 percent if soil erosion is allowed to remain unchecked. Even more striking is the estimate that sustainable potential rainfed crop productivity reduces by 28.9 percent if erosion is allowed to continue at its full rate. The larger decrease in rainfed productivity reflects the degradation of very productive land to productive or marginally productive land, while still remaining in the category of rainfed cropland. Additionally, land which degrades into not-suitable cropland, continues to have a productive potential through grassland/livestock production.

The overall loss in productivity, resulting from unchecked soil erosion in the five regions, is estimated at 18.5 percent. The situation is particularly severe in the largely rainfed dependent regions of Africa (24.9 percent) and South America (20.6 percent).

Refinements to these assessments are to be the subject of a separate report.

2.4.4 Allowances for Seed Requirements and Wastage Losses

Potential productivity estimates refer to the amount of production the land can be expected to produce under specified management and use assumptions. Not all this produce however is available for human consumption.

Certain quantities are required for seed and planting material for future cultivation. Crop specific allowance for seed and planting material requirements is included in the assessment (FAO, 1978-80).

Additionally, harvest and post-harvest losses need to be taken into account. Country and crop specific data on these losses are not yet available and in the present study, an overall 10 percent wastage has been assumed.

Application of the above described four components of productivity provides estimates of the potential production of crops according to the various soil and climatic conditions of the land inventory created by the study.

2.5 Estimation of Potential Population Supporting Capacities

The previously described rainfed crop production potentials, together with the production from irrigation, provide the basis for the estimation of potential population supporting capacities of the inventorized zones. This crop production is converted into calorie and protein equivalents using the international calorie and protein composition factors of crops (FAO, 1978-80). The production in terms of calorie equivalent facilitates the aggregation of different crops as well as providing a means of estimating the potential population that can be supported.

2.5.1 Crop Choice

A number of alternative crops are feasible for production in each of the agro-ecological cells of the compiled land inventory. The next stage of the methodology is therefore to choose a particular crop for each of the cells. This 'choice' is formulated as a linear programming model maximising calorie production (Shah and Fischer, 1980) with constraints at the length of growing period zone level, as follows:

ASSESSMENT	CONSTRAINT
Low level of inputs	- Presently grown mixture of crops
Intermediate level of inputs	- Presently grown mixture of crops/ minimum protein availability
High level of inputs	- Minimum protein availability.

The results from each cell, in each length of growing period zone, are totalled to arrive at the maximum calorie (and associated protein) production from each zone.

The above constraints are applied to obtain an 'acceptable' crop-mix at the length of growing period zone level. The presently grown mixture of crops constraint allows for continuation of current cropping patterns in the zones. The minimum protein availability constraint ensures that the chosen crop-mix meets minimum protein requirements. These minimum protein requirements are expressed in terms of calorie-protein ratios which are based on country specific FAO/WHO per-capita calorie-protein requirements. The calorie-protein contribution from irrigated production is taken into account, as appropriate, in choosing the acceptable crop-mixes.

For the low level of inputs assessments, the pattern of presently grown mixture of crops is rigidly maintained as a constraint on all potentially cultivable land, even although the crops presently grown may be inferior in terms of calorie-protein productivity.

At the intermediate level, the pattern of presently grown mixture of crops is applied to only half the potentially cultivable area and the balance of cultivable land is allocated to crops providing the highest calorie production with minimum protein constraint.

For the high level of inputs assessments, all cultivated land is allocated to crops providing the highest calorie production with minimum protein constraint, immaterial of the presently grown mixture of crops. This high level of inputs assessment thus includes the positive effects of optimal crop-mix, while ignoring effective crop preferences. An instant change in crop pattern (i.e. new crops instead of presently grown crops), to obtain maximum calorie-protein production, is not considered a realistic short-term possibility.

2.5.2 Presently Grown Mixture of Crops

The presently grown mixture of crops, reflecting local preferences, is expressed in terms of percentage of areas occupied by each of the crops considered by the study. This information was obtained for each length of growing period zone, within countries, from sub-national administrative crop area data. Such data include both rainfed and irrigated production.

Table 2.3 summarizes these results by major climate, lengths of growing periods and regions. The relative importance of particular crops in each length of growing periods is differentiated by classifying crops comprising: more than 50 percent, 25 to 50 percent, 10 to 25 percent and 5 to 10 percent of the extent of the growing period zone occupied by the crops of the study.

The distribution of food crops within lengths of growing period zones and major climates is, in general, consistent with ecological requirements for cultivation. This applies to all regions of the study. Apparent anomalous crop entries, in certain growing periods (e.g. 0 days dry), is accounted for by irrigated production.

In the longer lengths of growing period zones (more than 270 days), of the warm tropics and sub-tropics, the dominant crops are: Africa - cassava, South America and Central America - maize and Southeast Asia - rice. Maize is dominant in the sub-humid areas of Africa, South America and Central America, whereas rice is the dominant crop in these climates in Southeast Asia. In arid areas, the situation is confounded by irrigated production but, in general, sorghum is important in all regions except for South America and Central America where maize and wheat dominate.

In the moderately cool and cool tropics, the important crops are: Africa - maize, beans and wheat, Southwest Asia - sorghum, wheat and millet, South America - maize, potato and barley, Central America - maize, beans and sorghum, and Southeast Asia - rice, maize and sorghum.

In all regions with moderately cool and cool sub-tropics (summer rainfall) wheat and maize are the most widespread crops.

Production of wheat and potato in South America, and wheat and barley in Southwest Asia, is dominant in cool temperate climates.

Among the cereals, the most widely grown are: Africa - maize, millet and sorghum, South America - maize and wheat, Central America - maize, Southeast Asia - rice and Southwest Asia - wheat.

2.5.3 Potential Population Supporting Capacities

The computed rainfed calorie production potentials, for each length of growing period zone, are combined with appropriate irrigated calorie production data (Section 2.3.3) and converted into potential population supporting capacities by application of country specific per-capita calorie requirements (FAO, 1977). These requirements are based on sex and age distribution of the population and on the scales recommended by an FAO/WHO expert committee (FAO, 1973).

The contribution of irrigated production to the resultant total potential, by countries and for both time-frames, is shown in Table 2.4. A regional summary is presented below.

CONTRIBUTION[1/] OF IRRIGATED PRODUCTION TO TOTAL POTENTIAL POPULATION SUPPORTING CAPACITIES BY REGION

	AFRICA	SOUTHWEST ASIA	CENTRAL AMERICA	SOUTH AMERICA	SOUTHEAST ASIA
1975					
LOW INPUTS	9	80	38	6	39
INTER. INPUTS	<5	49	14	<5	14
HIGH INPUTS	<5	32	5	<5	8
2000					
LOW INPUTS	20	89	64	13	73
INTER. INPUTS	5	66	33	<5	41
HIGH INPUTS	<5	49	14	<5	28

[1/] percent of total potential population supporting capacity

These results show that the contribution of irrigation to potential population supporting capacity is much more important in Southwest Asia, Southeast Asia and Central America compared to Africa and South America. The situation at the country level, as shown in Table 2.4, also shows very marked differences,e.g. Egypt - 100 percent contribution from irrigation; Nigeria less than 5 percent (1975).

The final step in the study is comparison of the computed potential population supporting capacities with data on present and projected populations.

The United Nations' 1975 country estimates and the year 2000 projections (medium-variant) are the 'present' and 'projected' populations used in this comparison. Sub-national administrative area data from national population censuses were used to derive population estimates by length of growing period zones within countries for 1975.

The comparison of potential population supporting capacity with population for the year 1975 is undertaken at both the country and length of growing period zones levels. For the year 2000, the comparison is limited to the country level only. No attempt has been made to undertake zonal comparison for the year 2000 due to the difficulty of quantifying future migration movements among zones and hence the projected population by zone. In fact, the potential food production and the corresponding potential population supporting capacity in the various zones in each country is likely to be one of the important factors in determining these migration movements.

3. FINDINGS

3. FINDINGS

The study assesses potential population supporting capacities of land, under three levels of inputs circumstances, and compares these estimates with data on present and projected populations.

Population pressures are thus quantified and 'problem' areas delineated where land resources are insufficient to meet food needs. Such problem areas are designated as 'critical' areas and are defined in terms of their extent and the magnitude of their excess population. The analysis, at its finest level of detail, is undertaken at the level of individual-country length of growing period zones. Two time-frames are used in the study, namely the 'present' - as represented by base year 1975 data, and the 'future' - as represented by year 2000 projected data.

The potential population supporting capacities are computed for the three alternative levels of inputs circumstances described in Section 2.1, namely:

- low level of inputs, assuming only hand labour, no fertilizer and pesticide applications, no soil conservation measures and hence full productivity losses arising from land degradation, and cultivation of the presently grown mixture of crops on potentially cultivable rainfed lands;
- intermediate level of inputs, assuming the use of improved hand tools and/or draught implements, some fertilizer and pesticide application, some simple soil conservation measures lessening productivity losses from land degradation, and cultivation of a combination of the presently grown mixture of crops and the most calorie-protein productive crops, on potentially cultivable rainfed lands;
- high level of inputs, assuming complete mechanization, full use of optimum genetic material, necessary farm chemicals and soil conservation measures, and cultivation of only the most calorie-protein productive crops on potentially cultivable rainfed lands.

In all three alternatives, present/projected irrigated land areas are taken into account in computing the extents of potentially cultivable rainfed land. The assessed potential population supporting capacities include the calorie-protein production contribution from all present/projected irrigated areas.

Choice of 1975 as the base year, representing the 'present' time-frame, was dictated by the need to employ population and present crop-mix data at a sub-national level. The most up-to-date data available was for the year 1975.

The results are presented in the following sections, corresponding to four levels of aggregation, as illustrated in Figure 3.1 for Africa.

First, (Section 3.1), regional results, of present and projected populations and potential population supporting capacities, are presented and compared. This simulates the present and future situations assuming unrestricted movement of surplus potential production within regions (i.e. each region operating as a single independent entity).

Secondly, (Section 3.2), regional growing period zone and major climate results, of present populations and potential population supporting capacities, are analyzed and compared. This simulates the present situation with the assumption of unrestricted regional movement of surplus potential production within each growing period zone in each major climate (i.e. the constituent growing period zones of each major climate of each region operating independently of each other).

Thirdly, (Section 3.3), individual-country growing period zone results, of present populations and potential population supporting capacities, are presented and compared. Critical individual-country growing period zones are identified, in terms of their location, extent and excess populations. This third presentation simulates the situation of no movement of surplus between individual-country growing period zones (i.e. each individual-country growing period zone operating independently).

Fourthly, (Section 3.4), country results, of present and projected populations and potential population supporting capacities, are presented, analyzed, and compared. This fourth section simulates the present and projected situations with unrestricted movement of surplus within individual countries (i.e. each country operating as a single independent entity). Critical countries are thus identified, i.e. countries with insufficient land resources to meet their present and/or future food demands.

3.1 Regional Results

Regional results, of present and projected population densities and potential population supporting capacities, for the present (year 1975) and future (year 2000) time-frames, are presented in Table 3.1. The results are illustrated in the first (Figure 3.2) of the colour figures, which compare present and projected population densities (in red) and potential population supporting capacities (in green) under the circumstance of each of the three levels of inputs used in the study. For the purpose of page size presentation, a scale break (between 0.5 and 1.0) in the population density axis is employed in this and subsequent colour figures.

3.1.1 Present and Projected Population Densities

The data (Table 3.1 and Figure 3.2) show that present population densities vary from a low of 0.12 person per hectare in South America to a high of 1.25 person per hectare in Southeast Asia with an average (for the five regions) of 0.30 person per hectare. Year 2000 population densities are projected to be approximately double the 1975 densities, varying from a low of 0.22 person per hectare in South America to a high of 2.16 person per hectare in Southeast Asia, with an average of 0.55 person per hectare for the five regions.

3.1.2 Present and Projected Potential Population Supporting Capacities

Regional potential population supporting capacities (density-person per hectare) are generally well in excess of present and projected population densities. For the five regions in total, year 1975 potentials are 0.61, 2.11 and 5.05 person per hectare with low, intermediate and high levels of inputs respectively. The corresponding potentials, for year 2000 are 0.86, 2.30 and 5.11 person per hectare.

Variations in the individual regional values are wide, reflecting the differences in land resource endowment. With low level of inputs, the 1975 regional potentials range from a low of 0.16 person per hectare in Southwest Asia, to a high of 1.39 person per hectare in Southeast Asia; a more than eight-fold regional difference. The intermediate level of inputs potentials are 1.5 to 4.1 times greater than those at the low level, being respectively 0.25 (Southwest Asia), 1.53 (Africa), 1.65 (Central America), 2.92 (South America) and 3.76 (Southeast Asia) person per hectare. High level of inputs potentials, for the same time-frame, are 2.5 to 9.7 times greater than those at the low level, with South America showing the greatest increase (9.7 times greater).

Differences between the year 1975 and year 2000 potentials, reflect the net effect of the 'positive' influence of planned increases in irrigation production and the 'negative' influence of the additional non-agricultural land required for projected increases in populations. Accordingly, the largest increases in potential are found in those regions with greatest planned increases in irrigation production, namely Southeast Asia (2.0 times greater) and Southwest Asia (1.7 times greater).

The increase in potential, between the two time-frames, is least in those regions where planned increases in irrigation production are relatively small, namely Africa and South America (only 1.1 times greater).

3.1.3 Comparison of Present (and Projected) Populations with Present (and Projected) Potential Population Supporting Capacities

Comparisons of the regional present and projected population data, with the present and projected potential population supporting capacity assessments, reveal the extent to which land resources can/cannot meet the food needs of present and projected populations, on a regional basis.

In this section, these comparisons are effected in terms of:

- year 1975 potential: present population ratios,
- year 2000 potential: projected population ratios,
- year 1975 critical areas (1975 populations in excess of 1975 potentials),
- year 2000 critical areas (2000 populations in excess of 2000 potentials).

Regional ratios for the years 1975 and 2000, at the three levels of inputs circumstances, are presented overleaf.

These data show that the land of the five Regions together could, even with low level of inputs, meet the food needs of 2.0 times the year 1975 population and 1.6 times the food needs of the projected year 2000 population.

The individual regional values show that the lands of each region (with one exception) could more than meet the food needs of their year 2000 populations, even with low level of inputs; i.e. South America - 3.5 times, Africa - 1.6 times, Central America - 1.4 times and Southeast Asia - 1.1 times.

REGIONAL POPULATION RATIOS

LEVEL OF INPUTS	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	AVERAGE
YEAR 1975 POTENTIAL : PRESENT POPULATION RATIOS						
Low	3.0	0.8	5.9	1.6	1.1	2.0
Intermediate	11.6	1.3	23.9	4.2	3.0	6.9
High	33.9	2.0	57.2	11.5	5.1	16.6
YEAR 2000 POTENTIAL : PROJECTED POPULATION RATIOS						
Low	1.6	0.7	3.5	1.4	1.1	1.6
Intermediate	5.8	0.9	13.3	2.6	2.3	4.2
High	16.5	1.2	31.5	6.0	3.3	9.3

The exception, to these potentially regional self-sufficient food situations, is Southwest Asia where the ratios for the year 2000 are 0.7, 0.9 and 1.2 at the low, intermediate and high levels of inputs respectively, i.e. this region (as a whole) will need to apply more than intermediate level of inputs, to all its cultivable land, if it is to attain food self-sufficiency for its year 2000 population.

The populations (million person), exceeding the potential population supporting capacities 1/, in this critical region of 677.4 million hectare, are as follows:

LEVEL OF INPUTS	YEAR 1975	YEAR 2000
Low	29.0	84.7
Intermediate	not critical	25.8
High	not critical	not critical

The 1975 population of the region is 136.3 million and the projected population for the year 2000 is 264.7 million.

It must be emphasized that the results, presented in this section, are based on the assumptions of:

- allocation of all cultivable rainfed land to food crops,
- attainment (by the year 2000) of all planned increases in irrigated area and allocation of all irrigated lands to food crops,
- unrestricted movement of potential surplus production within regions.

1/ Calculations effected from original data at three decimal places.

Within these described regional situations, there are considerable extents of land which cannot meet the food needs of their populations. The locations and extents of these areas, and the populations involved, are assessed in the following sections.

3.2 Regional Growing Period Zone and Major Climate Results

In the foregoing section, all individual-country length of growing period zone results were aggregated in entirety to depict regional situations, i.e. each region operating as a single independent entity.

In the present section (3.2), the results are aggregated by the lengths of growing period zones and major climates occurring in each region, i.e. each growing period zone in a region is considered as a single and independent entity. The results are presented by regions, major climates and lengths of growing period zones in Table 3.2 and illustrated (for five main climates in each region) in Figure 3.3 (Africa), 3.4 (Southwest Asia), 3.5 (South America), 3.6 (Central America) and 3.7 (Southeast Asia). These results are presented to show the effects of the ecological environment on present and potential population densities.

3.2.1 Present Population Densities

The data (Table 3.2 and Figures 3.3 to 3.7) show that considerable variation exists, in present population densities, between major climates and between lengths of growing period zones.

For the five regions together, the average present population densities of major climates range from 0.55 person per hectare in the warm sub-tropics with summer rainfall, to 0.04 person per hectare in cool temperate areas.

These variations between major climates do however differ considerably between regions, as shown by the overleaf data extracted from Table 3.2.

In Africa, Southwest Asia, South America and Central America, the highest average densities occur in the cooler major climates, for example in Africa:

warm tropics	0.13 person per hectare;
moderately cool tropics	0.34 person per hectare;
cool tropics	0.35 person per hectare.

In the highly populated Southeast Asia region, however, this trend is reversed and the highest population densities are found in the warmer major climates, illustrated below:

warm tropics	1.21 person per hectare;
moderately cool tropics	0.99 person per hectare;
cool tropics	1.00 person per hectare.

PRESENT (YEAR 1975) POPULATION DENSITIES BY MAJOR CLIMATES AND REGIONS
(person per hectare)

MAJOR CLIMATE	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	AVERAGE
TROPICS						
Warm	0.13	0.06	0.10	0.49	1.21	0.31
Moderately cool	0.34	0.21	0.27	0.53	0.99	0.40
Cool	0.35	0.30	0.16	6.50	1.00	0.36
Cold 1/	0.42	-	0.19	5.92	0.03	0.31
SUB-TROPICS (SUMMER RAINFALL)						
Warm	0.01	-	0.06	0.11	1.97	0.55
Moderately cool	0.12	-	0.13	0.14	0.64	0.20
Cool	0.13	-	0.26	-	0.64	0.29
Cold 1/	0.42	-	0.04	-	0.29	0.17
SUB-TROPICS (WINTER RAINFALL)						
Cool	0.15	0.21	0.14	0.15	0.17	0.17
Cold 1/	0.49	0.32	0.28	-	0.22	0.31
TEMPERATE						
Cool	-	0.48	0.01	-	-	0.04
Cold 1/	-	0.29	0.01	-	-	0.19
Average	0.13	0.20	0.12	0.39	1.25	0.30

1/ Relatively small extents of land.

Present population densities also vary widely within major climates according to lengths of growing period zones, as shown by the following averages extracted from Table 3.2.

PRESENT (YEAR 1975) POPULATION DENSITIES BY LENGTH OF GROWING PERIOD (LGP) ZONES AND REGIONS
(person per hectare)

LGP ZONE (days)	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	AVERAGE
365^+ N (humid)	0.08	-	0.04	-	0.19	0.10
365^- N	0.11	-	0.11	0.28	0.57	0.18
330 - 364 N	0.20	1.46	0.15	0.41	1.29	0.31
300 - 329 N	0.27	1.00	1.10	0.41	1.14	0.26
270 - 299 N	0.23	0.63	1.12	0.39	1.69	0.41
240 - 269 N	0.22	0.78	0.16	0.45	1.75	0.50
210 - 239 N	0.24	0.93	0.14	0.66	1.49	0.54
180 - 209 N	0.19	1.05	0.13	0.82	1.42	0.54
150 - 179 N	0.19	0.60	0.31	0.55	1.97	0.64
120 - 149 N	0.24	0.40	0.29	0.43	1.92	0.70
90 - 119 N	0.20	0.41	0.51	0.37	1.82	0.63
75 - 89 N	0.15	0.48	0.19	0.26	1.90	0.40
1 - 74 N	0.07	0.27	0.10	0.13	0.84	0.16
0 (dry)	0.05	0.05	0.10	0.08	0.69	0.07
Average (all zones)	0.13	0.20	0.12	0.39	1.25	0.30

For the five regions in total, the highest present population densities occur in the 90-269 days group of growing period zones and the lowest in the 0-89 days group of growing period zones, e.g. 90-269 days: 0.50 to 0.70 person per hectare; 0-89 days: 0.07 to 0.40 person per hectare. Long lengths of growing periods, i.e. more than 269 days have intermediate density values, i.e. 0.18 to 0.41 person per hectare.

Specific regional exceptions to this general situation are however apparent from the data.

In Africa, the longer lengths of growing period zones (270 to 364 days) have generally higher average densities than the middle group of zones (90-269 days).

In Southeast Asia, the higher densities extend into the shorter lengths of growing period zones (0-89 days) because of the considerable extents of irrigated lands in these zones in this region. The same trend is discernible in the Southwest Asia region.

In general, however, it appears that the middle range of growing period zones (90-269 days) are preferred and without exception, the most humid zone (365 $^+$ days) is the least favoured of the longer lengths of growing period zones. Additionally the 0 (dry) zone is generally the least preferred of the shorter lengths of growing period zone group.

3.2.2 Potential Population Supporting Capacities

In contrast, potential population supporting capacities are, overall, highest in warm major climates (cf. lowest present population densities), and in the longer lengths of growing period zones (cf. intermediate present population densities).

The data, in Table 3.2 and Figures 3.3 to 3.7 show the aggregated potential population supporting capacities of lengths of growing period zones, by major climates in the five regions of the Developing World. These potentials well reflect differences in land resource endowment, between and within regions.

For the five regions in total, the highest potential population supporting capacities occur in the warmer major climates of the tropics, the sub-tropics, and the temperate regions, at all three levels of inputs circumstance. The results, for low level of inputs, are illustrated by the overleaf data extracted from Table 3.2.

These data show the following average potentials for the five regions in total: tropics: warm - 0.75; moderately cool - 0.16; cool - 0.12; and cold - 0.05 person per hectare respectively. This situation (high potentials in warm climates) is reflected by the results of most major climates in all regions. Marked exceptions occur in the tropics of Southwest Asia and the sub-tropics (summer rainfall) of Africa, where very large extents of land with severe moisture limitations (dry and short lengths of growing period zones) mask the thermal potentials of major climates.

LOW LEVEL OF INPUTS POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITIES BY MAJOR CLIMATES AND REGIONS
(density - person per hectare)

MAJOR CLIMATE	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	AVERAGE
TROPICS						
Warm	0.51	0.02	0.81	1.07	1.43	0.75
Moderately cool	0.17	0.08	0.07	0.23	0.23	0.16
Cool	0.12	0.05	0.14	0.08	0.10	0.12
Cold 1/	0.05	-	0.05	0.05	0.05	0.05
SUB-TROPICS (SUMMER RAINFALL)						
Warm	<0.01	-	0.71	0.50	1.90	0.67
Moderately cool	0.06	-	0.18	0.18	0.50	0.22
Cool	0.05	-	0.23	-	0.31	0.25
Cold 1/	0.05	-	0.05	0.05	0.20	0.13
SUB-TROPICS (WINTER RAINFALL)						
Cool	0.17	0.20	0.25	0.44	0.35	0.19
Cold 1/	0.05	0.09	0.05	-	0.45	0.15
TEMPERATE						
Cool	-	2.80	0.04	-	-	0.19
Cold 1/	-	0.05	0.05	-	-	0.05
Average	0.39	0.16	0.72	0.64	1.39	0.61

1/ Relatively small extents of land.

Equally large variations in population potentials also occur between lengths of growing period zones, as illustrated by the following data extracted from Table 3.2

LOW LEVEL OF INPUTS POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITIES BY LENGTH OF GROWING PERIOD (LGP) ZONES AND REGIONS
(density - person per hectare)

LGP Zone (days)	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	AVERAGE
365$^+$ N (humid)	1.43	-	0.95	-	1.21	1.09
365$^-$ N	1.76	-	1.37	1.04	1.92	1.58
330 - 364 N	1.37	4.29	0.90	1.30	1.90	1.21
300 - 329 N	1.40	2.23	0.92	1.66	1.65	1.09
270 - 299 N	0.85	0.83	0.65	0.82	1.30	0.82
240 - 269 N	0.82	1.33	0.83	1.00	1.34	0.93
210 - 239 N	0.59	0.32	0.82	0.77	1.26	0.80
180 - 209 N	0.46	0.28	0.65	0.69	0.98	0.60
150 - 179 N	0.47	0.89	0.52	0.70	1.72	0.79
120 - 149 N	0.16	0.37	0.18	0.27	1.38	0.50
90 - 119 N	0.13	0.65	0.61	0.18	2.07	0.71
75 - 89 N	0.06	0.22	0.20	0.28	1.64	0.31
1 - 74 N	0.03	0.28	0.07	0.30	1.51	0.22
0 (dry)	0.07	0.04	0.19	0.66	1.28	0.12
Average (all zones)	0.39	0.16	0.72	0.64	1.39	0.61

The data show that, in the five regions in total, highest potential population supporting capacities occur in the longer length of growing period zones, i.e. more than 269 days, where potential densities (at the low level of inputs circumstances) are in the range of 0.82-1.58 person per hectare. The middle group of growing period zones, i.e. 90-269 days have intermediate density values (0.50-0.93 person per hectare) while the shorter lengths of growing period group show the lowest potentials (i.e. 0.12-0.31 person per hectare). This pattern is particularly marked in those regions containing relatively small extents of irrigated lands, i.e. Africa, South America, and Central America. The high potentials in the shorter lengths of growing period zones in Southeast Asia reflect the large extents of irrigated land in those zones in that region.

3.2.3 Comparison of Present Populations with Present Potential Population Supporting Capacities

In the present section, the individual-country length of growing period zone results are aggregated by the lengths of growing period zones (and also by the major climates) occurring in each region. Findings thus assume unrestricted movement of surplus production potentials within the total extents of the growing period zones (and major climates) of each region. Implementation of such movement of potential surplus production is obviously not a practical possibility within extensive zones that cross many national boundaries and extend over several thousands of kilometres (Figure 3.1).

The present comparison therefore highlights regional level environmental effects and identifies growing period zones (and major climates) which are, in aggregate, critical.

The distribution of critical zones, within regions, in general reflects the previously described trends in present population and potential population supporting capacity distribution namely:

- aggregated over all lengths of growing periods, the moderately cool and cool major climates exhibit high present population densities but relatively low potential population supporting capacities;
- aggregated over all major climates, the middle range of growing periods (90-269 days) exhibit high present population densities, but are intermediate in potential between the long lengths with highest potentials and the short lengths with lowest potentials.

In accord with this situation, critical zones occur most frequently in the moderately cool and cool major climates and in the shorter and middle ranges of lengths of growing periods.

Table 3.2 and Figures 3.3 to 3.7, reveal the interactive effects of major climates and length of growing period zones. In the table, all potentials that are less than present population densities are marked by an asterisk, indicating the critical nature of the zone. In all regions, the longer lengths of growing period zones (more than 270 days) in warm tropical and sub-tropical (summer rainfall) major climates, do not (in aggregate) contain critical zones even with low level of inputs. At this level of inputs, critical zones are however apparent in all regions in the shorter lengths of growing period zones (less than 90 days) and partly extend into the middle range of growing period zones in Southeast Asia and Africa.

Particularly noticeable is the fact that all zones in the Sahel region of Africa (less than 150 days length of growing period) are critical with low level of inputs. Except for the shortest lengths of growing period zones (less than 75 days), this critical situation, in the warm major climates, does not occur with the intermediate level of inputs circumstance.

This overall situation, in the warm major climates, is in marked contrast to the more frequent occurrence of critical zones in the moderately cool and cool tropics and sub-tropics (summer rainfall).

In all regions, except for Southwest Asia, the percentage of critical zones in moderately cool and cool major climates, is two to nearly ten times the percentage in warm major climates.

Table 3.2 and Figures 3.3 to 3.7 show that, in the moderately cool and cool major climates, the critical zones are concentrated in the shorter lengths of growing period zones and that many, in this range, remain critical even with high level of inputs. However, considerable numbers of the longer lengths of growing period zones (in these major climates) are also critical, especially with low level of inputs, and in some cases with intermediate level of inputs. The situation is particularly critical in the cool and moderately cool tropics of Africa, Southeast Asia and South America where more than 80 percent of all growing period zones are critical at the low level of inputs circumstance.

Over the major extent of the cool sub-tropics (winter rainfall), the majority of the regionally aggregated lengths of growing period zones in Africa, South America and Central America, are not critical. This also applies to the moderately cool/cool and transitional moderately cool sub-tropics in South America and Central America. The relatively small extents of cool sub-tropics (winter rainfall) in Southeast Asia are however dominantly critical even at the high level of inputs.

3.3 Individual-Country Growing Period Zone Results

The individual-country length of growing period zone results simulate the situation of each growing period zone, in each country, acting as a single and independent entity, i.e. no movement of surplus between country zones. While the practicability of this degree of independence may be debated, results of individual-country growing period zone potentials are necessary for planning sub-national food and population distribution. Accordingly, the individual-country length of growing period zone results, for year 1975, are presented.

The very large number of individual-country length of growing period zones makes tabular presentation impractical. Hence the results, of potential population supporting capacities of each length of growing period zone in each country are presented, and compared with present population densities, in map form.

The thematic information shown on the maps is of two kinds. The base colours show potential population supporting capacities (person per hectare) of each individual-country growing period zone, grouped by the following seven classes: less than 0.1, 0.1-0.5, 0.5-1.0, 1.0-2.0, 2.0-5.0, 5.0-10.0, and more than 10.0 person per hectare. Extreme local variation of terrain of cold climates has necessitated the use of an estimated constant value for potential population supporting capacities in these areas on the maps.

Additionally, on the maps, growing period zones where the present (year 1975) population density is in excess of the potential (year 1975) population supporting capacity are identified, indicating a critical zone where land resources are insufficient to meet food needs at the specified level of inputs. Three maps (one for each level of inputs circumstance) are presented for each region, i.e. 15 maps in total.

Highlights of these cartographic presentations are as follows.

In terms of area, *Africa* has the greatest extent of critical zones, at the low level of inputs circumstances, - 1 355 million hectare, 47 percent of the total land area. Much of the high potential land in the centre of the continent is only sparsely populated. Across much of the Maghreb, both in the Atlas mountains and the more populated coastal areas, the 1975 population exceeds the low level of inputs long-term supporting capacity. At this level of inputs, virtually the whole of the 'Sahel' area is critical between latitudes 20° north and 12° north, taking in also the northern, savannah areas of Ghana, Togo and Nigeria. The critical area is very much thinner across the Sudan with its large extents of irrigated land, but broadens again to encompass much of Ethiopia and Somalia.

West Africa has individual zones of insufficient potential along the coast of Ghana, Togo and in a belt across some of the most populous areas of Nigeria. Many zones in East Africa are also critical. Much of Kenya is critical, as is a crescent extending along the great lakes from southeast Uganda, through Rwanda and Burundi, to Malawi, and a belt across the centre of Tanzania including the shorter lengths of growing period zones. In southern Africa critical dry zones, corresponding to the Sahel in the North, stretch the width of the continent from the coast of Angola, across northeast Namibia and the major part of Botswana, through southeast Zimbabwe to southern Mozambique and the southwest coast of Madagascar, with most of Lesotho also critical.

At intermediate level of inputs, the critical zones shrink to 36 percent of the land area. In the Maghreb, the Atlas mountains remain critical. Critical areas recede considerably from the Sahel, disappearing from Mali and Upper Volta, the north of Ghana and Togo, and the Sudan, and become much attenuated in the Ethiopian highlands, but remain widespread in Mauritania, Niger, Chad and Somalia. In East Africa most of Kenya, Rwanda and Burundi remain critical, along with the same parts of Tanzania. The potential population supporting capacity now exceeds the 1975 population for almost the whole of southern Africa, except for minor pockets, which make up a significant proportion of territory only for Lesotho.

The high level of inputs circumstances potentials still leave 31 percent of the land area of Africa critical. Most of the zones in the Sahel become non-critical, except in Mauritania. Most of the Ethiopian highlands become able to support their 1975 populations, as do most of the populous areas of Kenya, and even most of Rwanda and Burundi. The Atlas mountains, Somalia, the more arid zones of Kenya and the southeast coast of Madagascar, remain critical even at the high level of inputs.

Southwest Asia is the most critical region. At low level of inputs, the land resources of 75 percent of the region are insufficient to feed 1975 populations. Non-critical areas are more easily highlighted than critical ones. Only Turkey has a large extent of non-critical land, over much of its interior and most of northeast Turkey. Other non-critical areas include parts of northern Afghanistan; in Iran, a narrow strip of low lying land along the Caspian Sea and a few inland pockets, and parts of the southwest of the country.

In Syria and Iraq all zones are critical except the 0-75 day growing period zone (with large extents of irrigated land) and a few other isolated pockets. All zones in Lebanon and Jordan are critical as are the more populated zones in the south and west of the Arabian peninsula.

The intermediate level of inputs potentials reduce the critical area of critical zones only slightly, to 67 percent of the total. With this level of inputs, zones in the entire mediterranean coast of Turkey and the whole of northeast Turkey become non-critical, along with most zones in Syria and Iraq. Scattered zones in Iran and Afghanistan cease to be critical. There is little change in Jordan and Lebanon.

High level of inputs potentials still leave 63 percent of the total land area of this region critical. All but a few interior zones become non-critical in Turkey, Syria and Iraq, but only a marginal difference is made to Iran and Afghanistan. Small non-critical zones emerge in Jordan and Lebanon, and much of southwest Arabia becomes non-critical.

South America has the lowest percentage of critical zones, with low level of inputs the extent of critical zones is 213 million hectares, 12 percent of the continent's total land area.

At this level of inputs circumstance, critical zones are concentrated in a few areas such as the drier Caribbean coasts of Colombia and Venezuela, most of the cool and cold climates of the Andes from Colombia to southern Chile, together with some coastal areas in Ecuador and Chile.

The Guyanas and Suriname are virtually free of critical zones, as is the greatest extent of Brazil save for the drier areas of the northeast and a few cool zones in the southeast of the country. Paraguay has no critical zones, Uruguay only a thin coastal strip that includes the capital, Montevideo. In Argentina the eastern slopes of the Andes and the area south and west of Buenos Aires are critical.

The circumstances of intermediate level of inputs reduce the area of critical zones, in the region, to 8 percent of the total area, with a general shrinking of critical zones in the Andes. At high level of inputs, most of these critical zones disappear, leaving significant critical areas in the Andes only in Colombia, Ecuador, Bolivia and Chile. Elsewhere critical zones virtually disappear except for the Caribbean coasts of Colombia and Venezuela and the drier areas of northeast Brazil. The total area of critical zones at high level of inputs reduces to 4 percent of the continent, while areas of very high potential density emerge throughout the warm tropics of the region.

In *Central America* 67 million hectare (25 percent) out of this region's total land area of 272 million hectare, are critical with low level of inputs. The great bulk of the critical zones are found in the cool climates of the highland spine of the mainland with the most populated areas of Mexico, Guatemala, Honduras, Costa Rica and the whole of El Salvador affected. Also critical are the Antilles, Trinidad and Tobago, Barbados and Haiti, along with most of Jamaica and Puerto Rico and significant segments of Cuba and some zones in the Dominican Republic.

The intermediate level of inputs potentials reduce the extents of critical zones by some two-thirds, to 8 percent of the total area, though these still cover several densely populated zones in El Salvador, Honduras and Costa Rica. In the Caribbean most of zones in the Great Antilles become non-critical, except in Puerto Rico. In the Lesser Antilles, all zones in Barbados, Martinique and Antigua remain critical.

The high level of inputs circumstances reduce critical zones to 2.1 million hectare, less than one percent of the regional total, leaving only a few small scattered zones of criticality. At this level of inputs there are many relatively underpopulated zones of high potential especially along the lowland coasts of Central America.

In the *Southeast Asia* region, the extent of critical zones with low level of inputs, is extensive. At this level of inputs 313 million hectare, just over a third of the region's total land area of 898 million hectare, are critical. In the western part of the region, the populous north of Pakistan (zones from the Punjab to the foot hills of the Hymalayas) are critical, along with the dryer lowland zones in the South.

Throughout almost the whole of India, the 1975 populations exceed the potential population supporting capacities, at low input levels, with the exception of some zones in Rajastan, Gujarat, the Punjab and Haryana and the northeastern corner of Uttar Pradesh, along with parts of Darjeeling, Assam and Meghalaya. The whole of Bangladesh is also critical, excepting the zones in the district of Rajshahi and a small pocket in the northeastern corner of Sylhet. All the populous highland zones of Nepal and Bhutan are critical, as are the most densely populated zones of Sri Lanka, the Kandyan highlands, and the southern and northwestern coasts.

The potentials with intermediate level of inputs reduce the extents of critical zones by four-fifths - to 62 million hectare. Again referring to the western part of the region, roughly the same zones remain critical in Pakistan, Nepal and Bhutan, with a few extra pockets becoming non-critical. There is, however, a very big effect in India, where virtually all previously critical zones become non-critical excepting only two small areas in the southern Deccan and stretches of the Himalayan foothills.

Most of the zones in Bangladesh also become non-critical, except for a strip in the West. Most critical zones of Sri Lanka also cease to be so, save for a band encircling the central highlands, which contains the capital, Colombo.

The high level of inputs circumstances alter only marginally the extents that are critical at intermediate level, reducing the area of critical zones to 45 million hectare over the region in total.

In the eastern part of the region, the extent of critical zones is generally less widespread than in the western part. With low level of inputs, the greater parts of Burma, Thailand, Malaysia and Kampuchea and most of Lao, have few critical zones. However the three most populous countries do exhibit critical zones with low level of inputs. In Vietnam, zones of the densely populated deltas of the Mekong and the Red rivers, around Ho Chi Minh City and Hanoi, cannot support their present populations with low level of inputs. In Indonesia, while the islands of Sumatra and Kalimantan are virtually free of critical zones, almost the whole of Java, carrying two-thirds of Indonesia's population, is critical, along with Madura, Lombok and Timor and large areas of Sumbawa and Sumba. Most of the zones in the major islands of the Philippines are also at the limit of their potential population supporting capacity with the low level of inputs circumstances, especially zones in the most populated areas of Luzon.

With intermediate level of inputs, critical zones are limited in extent in all but two countries. In the Philippines, scattered critical zones only remain. However, in Indonesia the potential population supporting capacity is still not equal to the 1975 population in zones over almost the whole of Java. High level of inputs circumstances however, greatly improve the situation, leaving critical zones largely confined to the area south of Bandung. Large extents of zones with high potentials are apparent in Sumatra and parts of Kalimantan.

The total (summed) extents of all critical individual-country length of growing period zones, shown on the described regional maps, are presented in Table 3.3. This table provides data, by region, major climate and level of inputs, on:

- the location of critical zones,
- the extent of critical zones,
- the size of the total present (year 1975) population in the critical zone areas,
- the size of the excess (year 1975) population in the critical zone areas,
- the most seriously affected country.

For comparison, the total extent of the length of growing period zone, in which the critical zone areas occur, is given together with the total (year 1975) population of the length of growing period zone and the total number of countries containing the zone.

Regional summary extracts are presented below and are illustrated in Figure 3.8.

EXTENTS AND POPULATIONS OF CRITICAL INDIVIDUAL-COUNTRY
LENGTHS OF GROWING PERIOD (LGP) ZONES (YEAR 1975)
(million hectare and million person)

	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	TOTAL
TOTAL EXTENT OF ALL LGP ZONES	2 878.1	677.4	1 770.2	271.6	897.6	6 494.9
EXTENTS OF CRITICAL LGP ZONE AREAS AT:						
Low Inputs	1 354.7 (47.1)	505.9 (74.7)	212.5 (12.0)	67.3 (24.8)	312.5 (34.8)	2 452.9 (37.8)
Inter. Inputs	1 029.0 (35.7)	455.9 (67.2)	138.8 (7.8)	22.1 (8.1)	62.3 (6.9)	1 702.2 (26.3)
High Inputs	881.2 (30.6)	427.9 (63.2)	77.0 (4.3)	2.1 (0.8)	45.3 (5.0)	1 433.5 (22.1)
TOTAL POPULATION OF ALL LGP ZONES	380.2	136.3	215.8	106.6	1 117.7	1 956.6
TOTAL POPULATION OF CRITICAL LGP ZONE AREAS AT:						
Low Inputs	183.7 (48.3)	98.5 (72.3)	56.4 (26.1)	59.1 (55.4)	766.9 (68.6)	1 164.6 (59.5)
Inter. Inputs	73.5 (19.3)	72.7 (53.3)	36.6 (17.0)	28.7 (26.9)	175.8 (15.7)	387.3 (19.8)
High Inputs	44.3 (11.7)	61.1 (44.8)	15.1 (7.0)	9.2 (8.6)	82.2 (7.4)	211.9 (10.8)
SIZE OF POPULATION EXCEEDING POTENTIAL SUPPORTING CAPACITY IN CRITICAL LGP AREAS AT:						
Low Inputs	104.8	65.8	36.7	40.1	315.8	563.2
Inter. Inputs	42.5	42.0	21.7	14.3	56.0	176.4
High Inputs	26.5	26.3	9.6	8.0	31.3	101.7

Figures in parenthesis are percentages of regional Totals.

These summary data show that, with low level of inputs, the extent of critical zone areas in the five regions in the Developing World is 2 453 million hectare. Africa accounts for 55.0 percent of the total and this is equivalent to 47.0 percent of the total land area of Africa. Reference is made to the fact that 46.7 percent of the continent of Africa is not climatically suited to rainfed crop production - page 14. With high level of inputs, the total extent of critical zone areas in the five regions is reduced to 1 434 million hectare, i.e. 22.1 percent of the total land area. The critical zone areas of Africa account for 61.0 percent of the total critical area in the five regions at the high level of inputs.

The regional distribution of populations in the critical zone areas is in contrast to the critical land area distribution. At low level of inputs, 1 165 million person out of a total population (year 1975) of 1 957 million in the five regions, are assessed to be living on land resources which can meet the food needs of only 602 million person, i.e. an excess population of 563 million. Southeast Asia and Africa respectively account for 56.0 percent and 19.0 percent of this population in critical zone areas. At high level of inputs, the total population of critical zone areas is reduced to 212 million and the excess population is 102 million.

These individual-country length of growing period results highlight the limits of land resources to provide sufficient food for individual-country growing period zone populations. However, the occurrence of critical areas and corresponding excess populations should also be considered at the country level.

3.4 Country Results

The results presented in the previous section simulate the situation that would prevail if there were no movement of surplus between individual-country length of growing period zones. In reality such movement is an integral part of national food distribution systems.

Accordingly, this section presents the results of aggregations, to the country level, of present (year 1975) and projected (year 2000) population densities, and of present and projected potential population supporting capacities, at the three level of inputs circumstances. These country results are presented in full, in Table 3.4 and are illustrated in Figures 3.9 to 3.13, by regions.

In the table, the countries, assessed in each region are listed on the left-hand side of the table and column 1 records the total area of each country. Columns 2-6 of the table refer to the year 1975 situation and columns 7-11 refer to the year 2000 situation. For each of these two time-frames, data on total populations and population densities, and potential population supporting capacities at low, intermediate and high levels of inputs, are presented. Situations where national potential population supporting capacities are less than present (or projected) populations are indicated by asterisks. The order of countries, in each region, is alphabetic.

These results are presented, in a different form, in Table 3.5, which shows the ratios of present potential : present population (columns 4,5, and 6) and the ratios of projected potential : projected population (columns 9, 10 and 11). In this table, the order of countries in each region is in increasing order of year 2000 ratios, at the low level of inputs.

This section thus identifies (3.4.3) countries, whose land resources are insufficient to meet present and/or future food needs. Such countries are designated as critical countries and the excess population involved, by the three levels of inputs circumstances, are quantified.

3.4.1 Present and Projected Population Densities

The data (Table 3.4, and the red columns of Figures 3.9 to 3.13) show that present (1975) population densities (person per hectare) in Africa (Fig. 3.9) vary from a low of <0.01 in Western Sahara to a high of 4.85 in Mauritius. In Southwest Asia (Fig. 3.10) the present population densities vary from a low of 0.03 in Saudi Arabia to a high of 4.27 in Bahrain. In South America (Fig. 3.11), they vary from a low of 0.01 in French Guyana to a high of 0.24 in Ecuador. In Central America (Fig. 3.12), they vary from a low of 0.06 in Belize to a high of 5.70 in Barbados. In Southeast Asia (Fig. 3.12), densities vary from a low of 0.14 in Lao to a high of 38.79 person per hectare in Singapore.

The projected (year 2000) population densities, follow a similar country order as the present population and the differences between the two time-frames reflect projected population growth. In Africa (Fig. 3.9), projected densities vary from a low of 0.01 in Western Sahara to a high of 7.09 person per hectare in Mauritius. In Southwest Asia (Fig. 3.10), the projected population densities vary from a low of 0.07 in Saudi Arabia to a high of 8.97 in Bahrain. In South America (Fig. 3.11) they vary from a low of 0.01 in French Guyana to a high of 0.51 in Ecuador. In Central America (Fig. 3.12) they vary from a low of 0.10 in Belize to a high of 6.91 in Barbados. In Southeast Asia (Fig. 3.13) the projected population densities vary from a low of 0.24 in Lao to a high of 53.56 person per hectare in Singapore.

3.4.2 Present and Projected Potential Population Supporting Capacities

Data on present and projected potential population supporting capacities are presented in Table 3.4 and illustrated (green columns) in Figures 3.9 to 3.13.

Differences between present (1975) and projected (2000) potential population supporting capacities for any country are due to increases in non-agricultural land requirements relative to the effects of the projected increases in planned irrigation production.

Present potentials (person per hectare) at low inputs vary from low values of <0.01 - Western Sahara (Africa, Fig. 3.9), < 0.01 - Bahrain (Southwest Asia, Fig. 3.10), 0.17 - Chile (South America, Fig. 3.11), < 0.01 - Netherland Antilles (Central America, Fig. 3.12), < 0.01 - Singapore (Southeast Asia, Fig. 3.13), to high values of 3.47 - Mauritius (Africa), 0.67 - Lebanon (Southwest Asia), 2.72 - French Guyana (South America), 1.43 - Jamaica (Central America), and 2.66 - Malaysia (Southeast Asia).

The projected potentials with low inputs vary from low values of <0.01 - Western Sahara (Africa), < 0.01 - Bahrain (Southwest Asia), 0.34 - Chile (South America), <0.01 - Netherland Antilles (Central America), <0.01 - Singapore (Southeast Asia), to high values of 3.33 - Mauritius (Africa), 1.21 - Turkey (Southwest Asia), 2.72 - French Guyana (South America), 2.89 - Puerto Rico (Central America), 8.38 - Bangladesh (Southeast Asia).

The presently grown mixture of crops has a marked influence on these low level of input results. Accordingly, ranking of countries with regard to the potential of their land resources to support populations, is best achieved through consideration of the intermediate and high level potential population supporting capacities. Under these circumstances, the influence on the results, of a nutritional sub-optimum presently grown mixture of crops, is minimal.

Comparison of the high level of input country results, which corresponds to an optimum crop-mix for calorie-protein production (immaterial of the presently grown mixture of crops), provides the country rankings presented in the lower portions of Figures 3.9 to 3.13. In general, and aside from territories with large extents of irrigated lands, countries well endowed with warm major climates and long lengths of growing periods have the highest potentials e.g. Africa - Cameroon, Zaire, Equatorial Guinea, Congo.

Except for countries where potentials are extremely low, values at intermediate level of inputs are 2 to 4 times greater than those at low inputs and potentials at high inputs are 3 to 10 times greater.

3.4.3 Comparison of Present and Projected Populations with Present and Projected Potentials

Comparison of: a) country present populations with present (year 1975) potential population supporting capacities and b) country projected populations with projected (year 2000) potential population supporting capacities, identifies critical countries whose food needs cannot be met from national land resources. Such situations are shown, by levels of inputs, with asterisks in Tables 3.4 and 3.5 and are illustrated in Figures 3.9 to 3.13.

Summary data on the number of critical countries, their extents, their total populations and the size of the population exceeding the potential population supporting capacity are presented below, for the present (1975) situation.

NUMBER, EXTENTS AND POPULATIONS OF CRITICAL COUNTRIES - YEAR 1975

	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	TOTAL
Total number of countries	51	16	13	21	16	117
Number of critical countries with:						
Low inputs	22	15	-	11	6	54
Inter. inputs	7	12	-	4	1	24
High inputs	2	9	-	1	1	13
Total Extent (million hectare) of all countries	2 878.1	677.4	1 770.2	271.6	897.6	6 494.9
Extent (million hectare) of critical countries with:						
Low inputs	1 223.9 (42.5)	600.5 (88.6)	-	8.0 (2.9)	388.5 (43.3)	2 220.9 (34.2)
Inter. inputs	276.5 (9.6)	373.7 (55.2)	-	1.1 (0.4)	0.1 (<0.1)	651.4 (10.0)
High inputs	27.0 (0.9)	261.3 (38.6)	-	0.1 (<0.1)	0.1 (<0.1)	288.5 (4.4)
Total population (million) of all countries	380.2	136.3	215.8	106.5	1 117.7	1 956.5
Total population (million) of critical countries						
Low inputs	188.4 (49.6)	96.2 (70.6)	-	17.1 (16.1)	770.5 (68.9)	1 072.2 (54.8)
Inter. inputs	25.5 (6.7)	45.1 (33.1)	-	3.6 (3.4)	2.3 (0.2)	76.5 (3.9)
High inputs	0.4 (0.1)	18.9 (13.9)	-	0.2 (0.2)	2.3 (0.2)	21.8 (1.1)
Size of population (million) exceeding the potential supporting capacity with:						
Low inputs	66.9 (17.6)	34.0 (24.9)	-	8.6 (8.1)	168.2 (15.0)	277.7 (14.2)
Inter. inputs	5.1 (1.3)	18.7 (13.7)	-	0.4 (0.4)	2.3 (0.2)	26.5 (1.4)
High inputs	0.4 (0.1)	8.2 (6.0)	-	0.2 (0.2)	2.3 (0.2)	11.1 (0.6)

Figures in parenthesis are percentages of regional Totals.

The assessment of *the present (year 1975) situation* shows that, at low level of inputs circumstances, 54 countries are critical out of the total of 117 studied. These critical countries cover a total area of 2 221 million hectare (nearly one-third of the total land area) with a combined 1975 population of 1 072 million, 55 percent of the total for that year. In the critical countries, the size of the population exceeding the potential population supporting capacity, amounts to 278 million.

Twenty-two of the critical countries, at the low level of inputs circumstances, are in Africa, covering 43 percent of the continent's land area and containing 50 percent of its 1975 population. Africa accounts for 55 percent of the land area of all critical countries.

Percentage 'country' criticality is highest in Southwest Asia, where fifteen out of sixteen countries are critical at the low level of inputs, covering 89 percent of the region's land area and affecting 71 percent of its 1975 population.

In terms of size of population exceeding the potential population supporting capacity, the circumstance of Southeast Asia is most severe, with 771 million person - 71 percent of the total for all five regions - living in countries that are critical for 1975 at low level of inputs. Some 69 percent of the regional population is involved and 43 percent of the regional land area is affected.

Central America is also substantially affected at the low level of inputs circumstances, with 11 out of 21 countries critical, although only 16 percent of the regional population is located in these countries and only 3 percent of the land area is involved - most of the critical countries are relatively small Caribbean islands.

Only South America, at the low input level, has no countries unable to feed their 1975 population from their own land resources.

Raising inputs to the intermediate level has a very marked effect. At this level of inputs, the total number of critical countries falls by more than a half, to 24, and the affected area reduces to 10 percent of the total. The total population of critical countries decreases by more than 90 percent, to 77 million person, 27 million of whom are in excess of the potential population supporting capacity.

The high level of inputs circumstance reduces criticality even further in all regions except Southwest Asia, where nine countries, with a total population of 19 million (14 percent of the regional total) and covering 39 percent of the total area still remain critical. At this level of inputs, only two countries in Africa, one in Central America, and one in Southeast Asia remain critical and all have relatively small total populations. For all five regions, with high level of inputs circumstances, only 22 million person live in critical countries, with 11 million in excess of the potential population supporting capacity of those countries.

Assessment of *the situation for the year 2000* shows an increase of ten in the total number of countries expected to be critical, i.e. to 64 at low level of inputs circumstances. This is accompanied by slight decreases in the total populations and areas affected, due mainly to one very big country - India - becoming non-critical for the year 2000 because of projected large increases in irrigated production. The size of population exceeding the potential population supporting capacity in the five regions, rises from 278 million in 1975 to 503 million for the year 2000.

The regional projected situation varies widely, as shown overleaf by the summary data extracted from Tables 3.4 and 3.5 for year 2000.

NUMBER, EXTENTS AND POPULATIONS OF CRITICAL COUNTRIES - YEAR 2000

	AFRICA	SOUTHWEST ASIA	SOUTH AMERICA	CENTRAL AMERICA	SOUTHEAST ASIA	TOTAL
Total number of countries	51	16	13	21	16	117
Number of critical countries with:						
Low inputs	29	15	-	14	6	64
Inter. inputs	12	15	-	7	2	36
High inputs	4	12	-	2	1	19
Total Extent (million hectare) of all countries	2 878.1	677.4	1 770.2	271.6	897.6	6 494.9
Extent (million hectare) of critical countries with:						
Low inputs	1 302.2 (45.2)	600.5 (88.6)	-	24.6 (9.1)	88.7 (9.9)	2 015.9 (31.0)
Inter. inputs	623.2 (21.7)	600.5 (88.6)	-	6.0 (2.2)	14.5 (1.6)	1 244.2 (19.2)
High inputs	29.7 (1.0)	373.8 (55.2)	-	0.1 (<0.1)	0.1 (<0.1)	403.7 (6.2)
Total population (million) of all countries	780.1	264.7	392.6	215.2	1 937.1	3 597.7
Total population (million) of all critical countries						
Low inputs	465.8 (59.7)	195.3 (73.8)	-	51.6 (24.0)	341.3 (17.6)	1 054.0 (29.4)
Inter. inputs	110.1 (14.1)	195.3 (73.8)	-	24.1 (11.2)	156.4 (8.1)	485.9 (13.5)
High inputs	11.0 (1.4)	89.3 (33.7)	-	0.7 (0.3)	3.1 (0.2)	104.1 (2.9)
Size of population (million) exceeding the potential supporting capacity with:						
Low inputs	256.8 (32.9)	107.6 (40.7)	-	18.0 (8.4)	70.7 (3.7)	503.1 (14.0)
Inter. inputs	48.2 (6.2)	78.5 (29.7)	-	6.9 (3.2)	7.7 (0.4)	141.3 (3.9)
High inputs	2.3 (0.3)	41.9 (15.8)	-	0.5 (0.2)	3.1 (0.2)	47.8 (1.3)

Figures in parenthesis are percentages of regional Totals.

South America is projected free of critical countries even at the low level of inputs circumstances. In Southeast Asia, mainly because of the India contribution, the situation improves over 1975. Although the number of critical countries at low input levels remains at six, they are not the same sixcountries as in 1975. In this region the total area of critical countries falls from 388 million hectare to 89 million, and the population involved falls from 770 million to 341 million, of whom 71 million, or 4 percent are in excess of the potential population supporting capacity.

In the other three regions, however, criticality increases both in extent and degree. In Central America the number of countries unable to be self-sufficient in food for their year 2000 population with low level of inputs is 14 - three more than in 1975. The population of critical countries trebles, from 17 million in 1975 to 52 million in year 2000 (24 percent of the regional total).

In Africa the situation very markedly worsens. The number of critical countries, at low level of inputs, rises from 22 to 29 and the population of critical countries more than doubles, from 188 million to 466 million (60 percent of the regional total). Of these, nearly half - 257 million are in excess of the potential population supporting capacity.

The number of critical countries in Southwest Asia remains at fifteen. But the population of critical countries more than doubles, from 96 million to 195 million of whom 108 million, 41 percent, are in excess of the potential population supporting capacity.

Because the excess population is a higher proportion of the critical countries' total population in year 2000 (48 percent, against only 26 percent in 1975), increases in input level for that time-frame do not have such marked effects in reducing the number of affected countries, as for the 1975 time-frame. The number of countries that remain critical at intermediate level of inputs, at year 2000, is 36 - twelve more than in 1975. The same 15 Southwest Asia countries remain critical, as do 12 African countries. In all five regions, the population of critical countries, at intermediate level of inputs is 486 million - 13 percent of the total.

High level of inputs circumstances, reduce the number of critical countries to 19, with a population of 104 million - 3 percent of the total for all five regions. Eighty-nine million of these are in Southwest Asia, where 12 countries remain critical even with high level of inputs. Only four African countries, two Central American and one Southeast Asia country remain critical at high level of inputs, with a total population of 15 million.

4. REVIEW AND IMPLICATIONS

4. REVIEW AND IMPLICATIONS

The results of the study reveal very large differences, in present (year 1975) and projected (year 2000) populations, and in present and projected potential population supporting capacities both within and between countries (and regions). These differences are reflected by equally large variations in adequacies (or inadequacies) of the available land resources to meet the food needs of present (and/or projected) populations.

At the finest unit of analysis, i.e. the individual-country length of growing period zones (Section 3.3) potential population supporting capacities with low level of inputs, vary from lows of 0.01 person per hectare in zones with poor climatic and soil resources, to highs of more than 5.0 person per hectare in zones with good land resource endowment.

These variations in potential occur both within and between countries as exemplified by the following results from two countries in West Africa. Niger, with poor climatic and soil resource endowment has a low average national potential of 0.01 person per hectare while the adjoining country of Nigeria, well endowed with land resources, has an average national potential fifty times greater i.e. 0.59 person per hectare. Within country variations in land resource endowment are well reflected by the individual-country zone potentials for the latter country which vary from a low of 0.03 person per hectare in the 75-89 days length of growing period zone in the northeast, to 2.95 person per hectare in the 365 days growing period zone in the south of the country, an increase of some 100-fold in potential.

Equally important is the ability, of the land resources of individual-country lengths of growing period zones, to respond to increased levels of inputs. Averaged over the five regions of the study, potentials with intermediate and high levels of inputs are respectively three and eight-fold greater than those at the low level of inputs. Within these general response ranges, zones with severe climatic and/or soil constraints respond little to increased levels of inputs, while the potentials of zones with only minor constraints may increase by more than ten-fold. The higher potentials, with increased inputs, are due not only to yield increases but also to reduced fallow periods and degradation losses.

● Under the extreme circumstance of each individual-country length of growing period zone acting as a single and independent entity, the extent of critical zone areas and the size of population exceeding the potential population supporting capacity, is large. With the low level of inputs circumstance, an estimated 2 453 million hectare of land in the five regions, are assessed as being unable to meet the food needs of present (year 1975) populations. This critical extent is reduced to 1 434 million hectare with high level of inputs. Sizes of populations, exceeding the potentials are estimated at 563, 176 and 102 million with low, intermediate and high levels of inputs respectively (Section 3.3).

The extent of these critical areas is most marked in Southwest Asia where 75 percent (506 million hectare) of the total land area is assessed as critical at low level of inputs. Equivalent figures for other regions are: Africa - 47 percent (1 355 million hectare); Southeast Asia - 35 percent (313 million hectare); Central America - 25 percent (67 million hectare) and South America - 12 percent (213 million hectare).

Location, of these critical individual-country length of growing period zone areas, varies between regions. In the tropics they are generally confined to lengths of growing period zones of less than 150/180 days in the warm tropics, but extend over most growing periods in the more densely populated moderately cool and cool tropics. The degree of criticality, as expressed by the ratio-present potential population supporting capacity : present population, is highest in these latter cooler major climates where some individual-country zone areas remain critical even at the high level of inputs. The exception to this general picture is Southeast Asia where critical zone areas extend into the densely populated longer lengths of growing period zones of the warm tropics, at low level of inputs. The situation is particularly critical in some parts of Indonesia where some of the 365^- and 365^+ day zones remain critical with high level of inputs.

- Aggregation of the above described individual-country length of growing period zone results, into regional level growing period zone results (Section 3.2), represents another extreme and emphasises the consequence of land resource endowment on potential population supporting capacity. In the five regions, the highest average potentials occur in the warmer areas of the tropics, sub-tropics and temperate climates e.g. tropics: warm - 0.75, moderately cool - 0.16 and cool - 0.12 person per hectare respectively, at low level of inputs.

This situation (high potentials in warm climates) is reflected by the results of most major climates in all regions. Marked exceptions occur in the tropics of Southwest Asia and the sub-tropics (winter rainfall) of Southeast Asia, where very large extents of land have severe moisture limitations which mask the thermal potentials of warmer major climates.

Equally larger variations in potential population supporting capacities also occur between lengths of growing period zones, grouped for all major climates. In the five regions, highest average potentials occur in the longer lengths of growing period zones, i.e. more than 269 days, where potentials, (with low level of inputs) are in the range 0.82 - 1.58 person per hectare. The middle group of growing period zones, i.e. 90-269 days, exhibit intermediate values (0.50-0.93 person per hectare) while the shorter length of growing period group, with severe moisture limitations, exhibit the lowest potentials (0.12 - 0.31 person per hectare). This pattern is particularly marked in those regions containing relatively small extents of irrigated areas, i.e. Africa, South America and Central America. The relatively high potentials in the shorter lengths of growing period zones of Southeast Asia reflect the higher incidence of irrigation in those zones of that region.

Comparison of these regionally aggregated length of growing period zone results with corresponding present (year 1975) population data, identifies critical zones at this regional level. The overall picture is in accord with the previously described patterns, namely:

- averaged for all lengths of growing period zones, moderately cool and cool major climates exhibit high present population densities and low potential population supporting capacities leading to frequent occurrence of critical zones in these major climates,

- averaged for all major climates, the middle range of growing period zones (90-269 days) show high present population densities and intermediate potentials which are generally adequate to meet food needs. Long lengths of growing period zones (more than 269 days) have high potentials and, in general, are not critical. Short lengths of growing period have low potentials and a high proportion of these areas are critical.

- Aggregation of the first described individual-country length of growing period zone results, into regional results (Section 3.1) simulates the also extreme situation of each region acting as a single and independent entity. Such aggregation allows comparison of the potentials with present (year 1975) and projected (year 2000) populations.

This regionally aggregated data show that, given the assumption of the study, the land of the five regions together, even with low level of inputs, could provide the food needs of 2.0 times the year 1975 population and 1.6 times the projected year 2000 population. Regional differences within this overall situation, are considerable. Comparisons of the year 2000 low level of inputs potential, with the population projected for that year, reveal that four out of five regions (acting as separate and independent entities) could meet regional food needs with low level of inputs, as follows: South America - 3.5 times, Africa - 1.6 times, Central America - 1.4 times and Southeast Asia - 1.1 times.

The exception, to these potentially satisfactory overall regional situations, is Southwest Asia. For this region, the ratio of population to potential, for the year 2000, is 0.7 with low level of inputs and 0.9 with intermediate level of inputs. Only with high level of inputs does the ratio exceed 1.0 (1.2), i.e. this region (as a whole) will need to apply more than intermediate level of inputs if it is to meet, from its land resources, the food needs of its projected year 2000 population.

The three above described sets of results (the individual-country length of growing period zone results; the regionally aggregated growing period zone results; the regional results) comprise three markedly contrasting degrees of aggregation, and hence three markedly contrasting assumptions with regard to movement of surplus potential production, namely movement:

- within individual-country lengths of growing period zones,
- within regional lengths of growing period zones,
- within regions.

- A situation more comparable with present day reality is the assumption of movement of surplus within each country, i.e. each country acting as a single and independent entity. The results of such an assumption are provided by the described country results (Section 3.4). These show a total of 54 countries, in the Developing World, unable to meet the food needs of their 1975 populations from their own land resources with low level of inputs; (Africa - 22 countries; Southwest Asia - 15; Central America - 11; Southeast Asia - 6). The total land area of these critical countries is 2 221 million hectare and the size of population exceeding the potential population supporting capacity is 278 million people. Even with application of intermediate level of inputs, to all cultivable land, 24 countries are unable to meet full food needs of their 1975 populations (land area - 651 million hectare; excess population - 27 million). Nineteen of these countries will be unable to meet future (year 2000) food needs even with high level of inputs (land area - 404 million hectare; excess population - 48 million).

Within the context of these critical country situations, it is of interest to consider the feasibility of food importation from the geographically nearest country with a surplus potential population supporting capacity, and preferably with a common border. An example of such analysis is presented overleaf for Africa.

In the African continent, for the year 1975 time-frame, at the low level of inputs, there are 22 countries critical at the national level. As shown overleaf these countries may be aggregated into 10 potential food deficit - potential food surplus geographical groups.

GEOGRAPHICAL GROUPING OF POTENTIAL FOOD DEFICIT ('CRITICAL') COUNTRIES AND POTENTIAL FOOD SURPLUS COUNTRIES: AFRICA 1975

Geographical Location	LOW LEVEL OF INPUTS		INTERMEDIATE LEVEL OF INPUTS		HIGH LEVEL OF INPUTS	
	Potential Food[1] Deficit Countries	Potential Food[2] Surplus Countries	Potential Food[1] Deficit Countries	Potential Food[2] Surplus Countries	Potential Food[1] Deficit Countries	Potential Food[2] Surplus Countries
North Africa	Libya (0.6) Tunisia (3.1) Algeria (8.6) Morocco (4.7) Ethiopia (11.8)	Sudan (43.4)				
West Africa	Senegal (0.6) Western Sahara (0.1) Cape Verde (0.3)	Guinea (10.6)	Western Sahara (0.1) Cape Verde (0.3)	Guinea (49.6)	Western Sahara (0.1) Cape Verde (0.3)	Guinea (170.2)
	Niger (3.8)	Chad (9.3)	Niger (2.4)	Chad (65.5)		
	Upper Volta (0.6)	Ghana (10.3)				
	Mauritania (0.9)	Mali (2.0)				
	Nigeria (11.6)	Cameroon (69.3)				
Eastern Africa	Rwanda (3.4) Burundi (3.1) Kenya (9.8) Somalia (1.9) Uganda (0.4)	Tanzania (19.8)	Rwanda (0.5) Kenya (1.4) Somalia (0.8)	Tanzania (128.9)		
	Comoros (0.2) Reunion (0.4) Mauritius (0.3)	Madagascar (40.6)	Reunion (0.1)	Madagascar (184.4)		
Southern Africa	Lesotho (0.6)	Zimbabwe (4.1)				
	Namibia (0.1)	Angola (47.0)				
Total Number of Countries	22 Countries	10 Countries	7 Countries	4 Countries	2 Countries	1 Country
Total Food Deficit (million person) Total Food Surplus (million person)	(66.9)	(256.4)	(5.1)	(428.4)	(0.4)	(170.2)

[1] Number in parenthesis shows excess population in millions, i.e. population for whom food would need to be imported for self-sufficiency at the country level.

[2] Number in parenthesis shows surplus potential population in millions, i.e. food to support this level of excess population is available for export.

At the low level of inputs circumstance, the total deficit of the 22 critical countries amounts to a food requirement for 66.9 million person and the total surplus of the 10 common border countries is equivalent to a potential population supporting capacity for 256.4 million, i.e. the 22 deficit countries require 26.1 percent of the surplus production potential of 10 countries. In comparison, at the Africa regional level, the total food surplus in the region is equivalent to a population excess supporting capacity for 741.7 million person.

At the intermediate level of inputs, there are seven critical countries with a food deficit equivalent to 5.1 million person. Four common border surplus countries have an excess potential for 428.4 million person and hence 1.2 percent of the excess production potential would meet the deficit. Finally, at the high level of inputs, the food deficit of two critical countries can be met by less than 0.1 percent of surplus potential production of one country.

The country results provided in this report allow for such analysis to be undertaken for any required grouping of countries in each of the five regions of the study.

- While the findings are the results of a 'first approximation' study on the basis of a 1:5 million scale land inventory, they clearly identify a major problem area in the complex population/food equation, namely - land resource endowment.

The assessed increase in the number of critical countries by the year 2000, at low level of inputs, provides a firm indication that national possibilities for meeting future food needs from expansion of cultivated area, are restricted. Land, and its potential to produce is limited and it is assessed that, by the year 2000, more than half of the total number of countries studied have insufficient land resources to attain food self-sufficiency with low level of inputs, even if they were able to cultivate all their potentially cultivated land. The extent of the problem is quantified by the present study and some possible solutions are identified.

For those areas where the situation is critical at low level of inputs circumstances, increases in rainfed production can only come from application of higher input level packages. The country results indicate that this will be the position in 64 countries in the Developing World by the year 2000.

Of these 64 countries, 28 could meet their year 2000 food needs from their land resources through application of intermediate level of inputs packages to all potentially cultivable rainfed lands.

In the remaining 36 countries, even application of intermediate level of input packages to all potentially cultivable rainfed lands will not be sufficient to meet projected food needs.

Seventeen of these 36 countries will need to attain application of high level of input packages (including complete conservation measures on all cultivable land) if they are to be self-sufficient in food production.

The implications of these findings are great, particularly with regard to required land clearing, increased input use and massive movement of labour and surplus potentials within the envisaged time-frame. Such implications are to be explored in the final report on the project, subsequent to this technical report.

The remaining 19 countries are assessed as having insufficient land resources to meet their future food requirements, through intensification of rainfed production and implementation of presently projected expansion of irrigated production. The majority of these countries are in the Southwest Asia region and the remainder are island states in other regions. All need to rely on food imports.

For those areas, solutions involving population planning and distribution, major land improvements including irrigation, and food importation (especially from adjacent surplus countries) are the only long-term remedies. Without such remedies, continuation of the present situation in critical areas not importing food, can only lead to accelerated worsening conditions through a vicious circle of land degradation, declining productivity and hunger.

- At best, the above is a conservative view, because of the assumption of all potentially cultivable land being allocated to food crops.

Should present cash crop land requirements be considered, additional countries may have difficulty in meeting their future food needs. On the assumption that at least one-third of the potentially cultivable land is required for cash crops and/or food crops to take account of inequities in food distribution, the number of countries in this situation increases to:

Critical with low inputs	- 74
Critical with intermediate inputs	- 42
Critical with high inputs	- 27.

- Achievements of such remedial measures, as described above will undoubtedly involve application of many social, economic and institutional policies in the context of all human, national and material resources. The present study quantifies the physical land resource potential component and provides the essential data base and starting point for consideration of viable development alternatives. Present problems of hunger are very complex and can be solved only by combined efforts in all of the above mentioned fields. It is believed that the present report highlights the need to provide the reference resource base, for such efforts, through detailed country studies on irrigation and rainfed production potentials and on potential population supporting capacities of lands. Only with such national level studies will it be possible to plan adequately for the wellbeing of present and future populations on a sound environmental basis.

- It is hoped that the experience gained in the present study will be used and that, within the limits of working means available, FAO will have the opportunity to assist in this work. The activities presented become the starting point of various new investigations in the field of food and agriculture.

Acknowledgements

The advice, guidance and support so willingly provided by many colleagues in FAO and IIASA, during the course of the study, is most gratefully acknowledged by the authors, with particular appreciation expressed for the very significant contributions made by Janos Hrabovszky and Stan Wood.

The study would not have been possible without the resources and strong support of UNFPA, FAO and IIASA throughout the duration of the project.

REFERENCES

Arnoldus, H.M.J. Degradation hazard evaluation. *In*: Report on the second FAO/UNFPA
1980 expert consultation on land resources for populations of the future. Food and Agriculture Organization of the United Nations, Rome: p. 341-351.

AGP Climatic Data Bank. Data held as agro-climatic summaries by Plant Production and
1976 Protection Division. Food and Agriculture Organization of the United Nations, Rome.

Dudal, R. and Batisse, M. The Soil Map of the World. *In*: Nature and Resources.
1978 Vol. XIV, No. 1, January-March. United Nations Educational Scientific and Cultural Organization, Paris.

FAO. FAO/Unesco Soil Map of the World, 1:5 million, Vols. 1-10. United Nations
1971-81 Education and Scientific Organization, Paris.

FAO. Energy and protein requirements. Report of a Joint FAO/WHO *ad hoc* Expert
1973 Committee, FAO Nutrition Meetings Report Series No. 52. WHO Technical Report Series No. 322. Food and Agriculture Organization of the United Nations, Rome.

FAO. A framework for land evaluation. Soils Bulletin No. 32. Food and Agriculture
1976 Organization of the United Nations, Rome.

FAO. The fourth world food survey. FAO Statistics Series No. 11, FAO Food and
1977 Nutrition Series No. 10. Food and Agriculture Organization of the United Nations, Rome.

FAO. Reports on the First and Second FAO/UNFPA expert consultations on land
1978-80 resources for populations of the future. Food and Agriculture Organization of the United Nations, Rome.

FAO. Reports of the agro-ecological zones project. World Soil Resources Report
1978-81 No. 48, Vol.1 - Africa, Vol.2 - Southwest Asia, Vol. 3 - South and Central America, Vol.4 - Southeast Asia. Food and Agriculture Organization of the United Nations, Rome.

FAO. Agriculture:Toward 2000. Food and Agriculture Organization of the
1981 United Nations, Rome.

FAO/UNDP A reconnaissance study of changes in settlement and related non-agricultural
1952-74 land use in Bangladesh. Land use policy project (BGD/78/014). Food and Agriculture Organization of the Untied Nations, Rome.

FAO/UNEP/Unesco. A provisional methodology for soil degradation assessment. Food
1979 and Agriculture Organization of the United Nations, Rome.

Higgins, G.M. and Kassam, A.H. Relating potential productivity to soil loss. Land
1981 and Water Technical Newsletter No. 9: p. 21-25. Food and Agriculture Organization of the United Nations, Rome.

Hyde, R.F., Vesper, N.J., Moore, R.S. and Goldblatt, I.A. Measurement of non-
1980 agricultural uses of land for nine selected areas in Africa by means of landsat MSS data. Report on FAO Contract No. UNFPA/INT/75/P13-2/AGL. Holcombe Research Institue, Butler University, Indianapolis, Indiana.

Kassam, A.H., Kowal, J.M. and Sarraf, S. Climatic adaptability of crops. Consultants'
1977 Report, Agro-ecological zones project, AGLS, Food and Agriculture Organization of the United Nations, Rome.

Kassam, A.H. Agro-climatic suitability and yields of rainfed crops of winter barley,
1979a upland rice, groundnut, sugarcane, banana/plantain and oil palm. Consultant's Working Paper No. 4. FAO/UNFPA Project INT/75/P13. Food and Agriculture Organization of the United Nations, Rome.

Kassam, A.H. Multiple cropping and rainfed crop productivity in Africa. Consultant's
1979b Working Paper No. 5. FAO/UNFPA Project INT/75/P13. Food and Agriculture Organization of the United Nations, Rome.

Marsh, B.a.'B. Economics of soil loss: a top priority research need.Paper in support
1980 of poster display. International soil conservation conference, N.C.A.E., Silsoe, Bedford, U.K.

Shah, M.M. and Fischer, G. Assessment of population supporting capacities: overall
1980 computer programs. In: Report on the second FAO/UNFPA expert consultation on land resoruces for populations of the future. Food and Agriculture Organization of the United Nations, Rome: p. 31-55.

Spaulding, B.W. and O'Heady, E. Future use of agricultural land for non-agricultural
1977 purposes. In: Journal of Soil and Water Conservation, Vol. 32, No. 2:88-90.

Sys, C. and Riquier, J. Ratings of FAO/Unesco soil units for specific crop production.
1980 Consultants' Working Paper No. 1. FAO/UNFPA Project INT/75/P13. Food and Agriculture Organization of the United Nations, Rome.

U.N. World population trends and prospects by country (1950-2000). Summary
1979 report of the 1978 assessment, ST/ESA/Ser. R/33. United Nations, New York.

Wong, I.F.T. Large scale aerial photography for detail land use survey of paddi-
1977 growing areas. In: Proceedings of the Third ASEAN soil conference. Kuala Lumpur, Malaysia: P. 271-277.

Wood, S.R. The allocation of irrigated areas and production by agro-ecological
1980 zones. Consultant's Working Paper No. 7. FAO/UNFPA Project INT/75/P13. Food and Agriculture Organization of the United Nations, Rome.

Young, A. and Wright, A.C.S. Rest period requirements of tropical and sub-tropical
1980 soils under annual crops. Consultants' Working Paper No. 6. FAO/UNFPA Project INT/75/P13. Food and Agriculture Organization of the United Nations, Rome.

Zarqa, S. Private communication. Statistics Division. Food and Agriculture Organization
1981 of the United Nations, Rome.

FIGURES
AND
TABLES

Figure 1

METHODOLOGY – FPA/INT/513

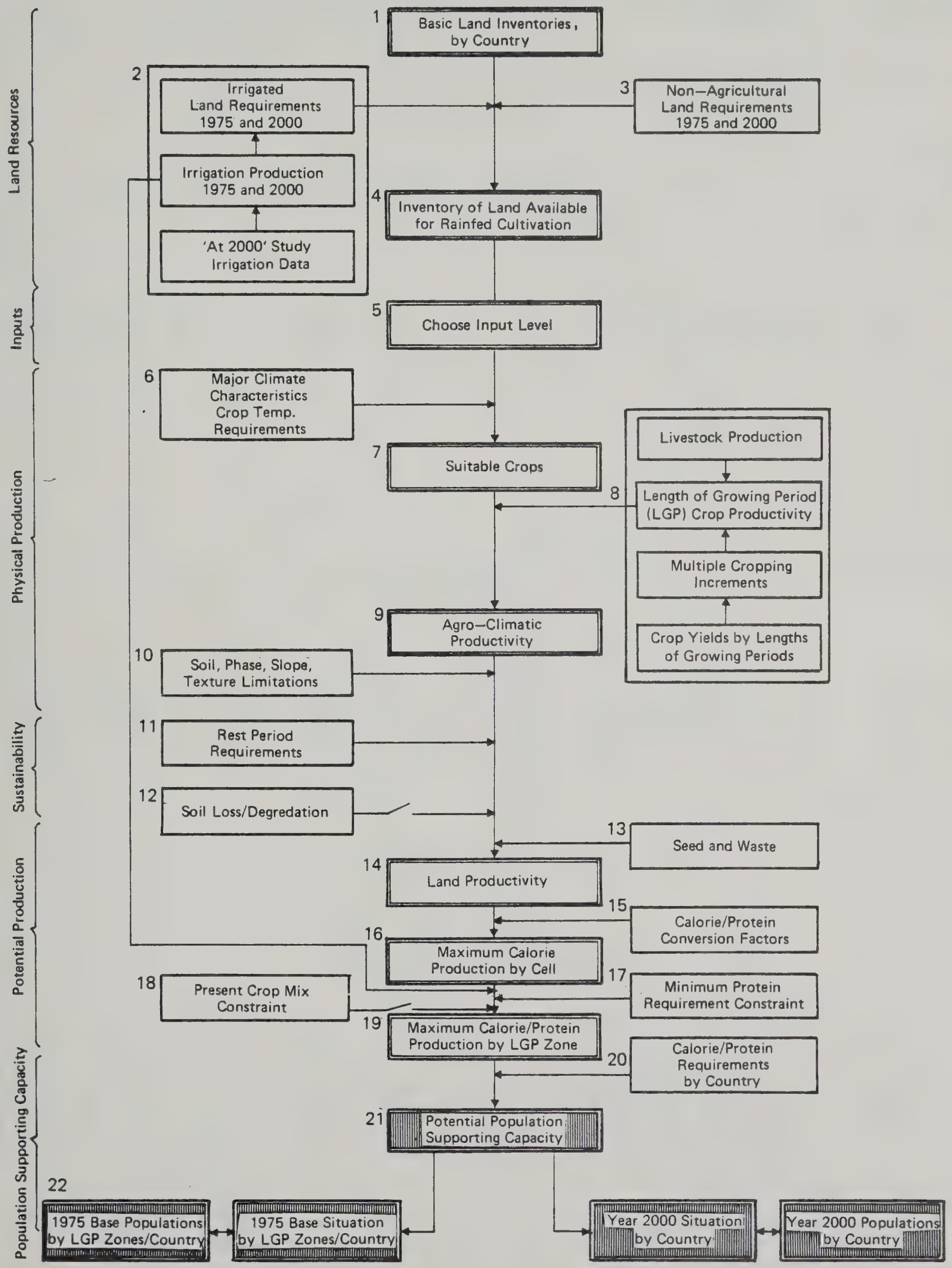
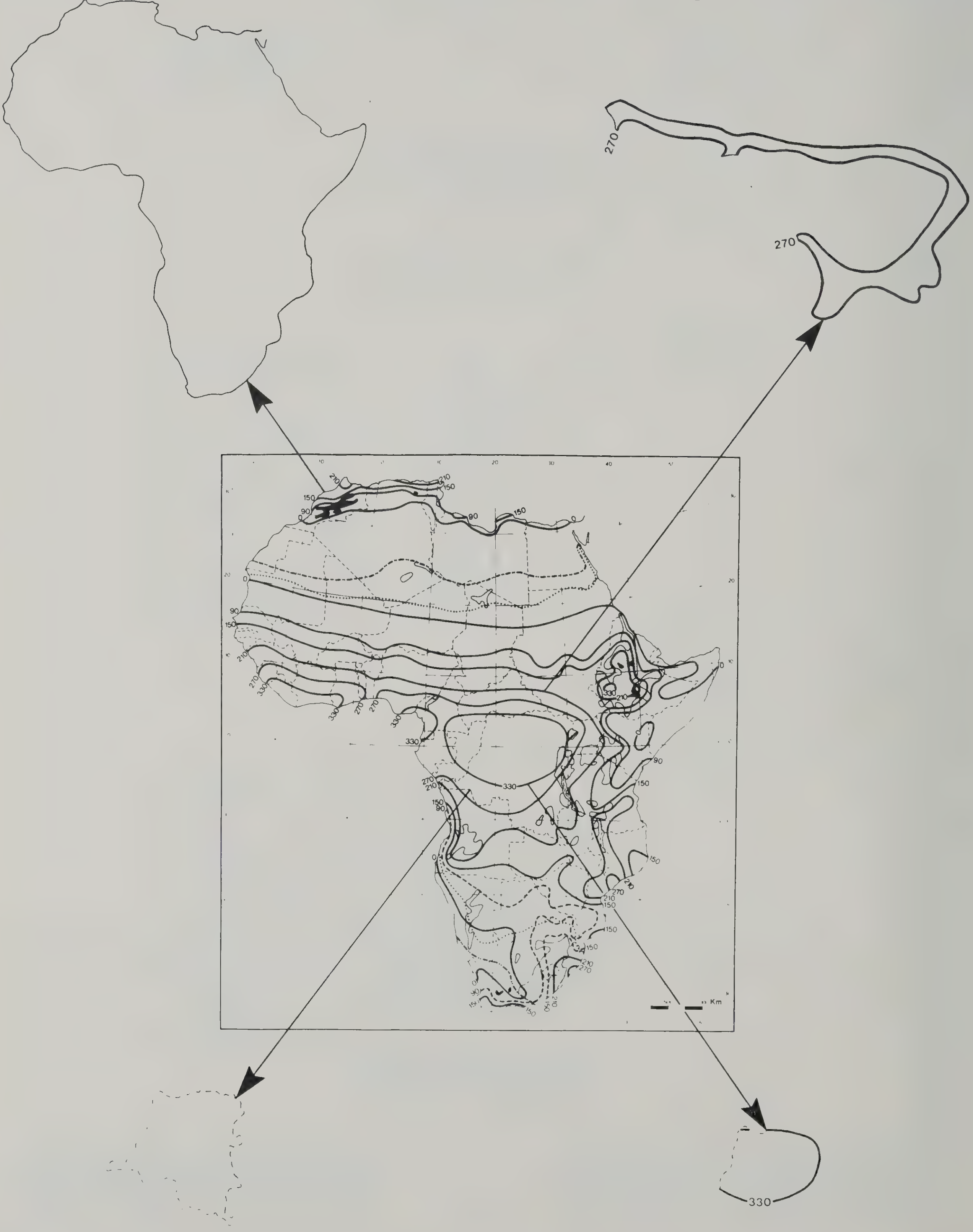

Land Resources
Inputs
Physical Production
Sustainability
Potential Production
Population Supporting Capacity
1 Basic Land Inventories, by Country
2 Irrigated Land Requirements 1975 and 2000
Irrigation Production 1975 and 2000
'At 2000' Study Irrigation Data
3 Non–Agricultural Land Requirements 1975 and 2000
4 Inventory of Land Available for Rainfed Cultivation
5 Choose Input Level
6 Major Climate Characteristics Crop Temp. Requirements
7 Suitable Crops
Livestock Production
8 Length of Growing Period (LGP) Crop Productivity
Multiple Cropping Increments
Crop Yields by Lengths of Growing Periods
9 Agro–Climatic Productivity
10 Soil, Phase, Slope, Texture Limitations
11 Rest Period Requirements
12 Soil Loss/Degredation
13 Seed and Waste
14 Land Productivity
15 Calorie/Protein Conversion Factors
16 Maximum Calorie Production by Cell
17 Minimum Protein Requirement Constraint
18 Present Crop Mix Constraint
19 Maximum Calorie/Protein Production by LGP Zone
20 Calorie/Protein Requirements by Country
21 Potential Population Supporting Capacity
22 1975 Base Populations by LGP Zones/Country
1975 Base Situation by LGP Zones/Country
Year 2000 Situation by Country
Year 2000 Populations by Country

Figure 3.1

PRESENTATION OF RESULTS : LEVELS OF AGGREGATION



1. REGIONAL AGGREGATION

2. REGIONAL GROWING PERIOD ZONE AND MAJOR CLIMATE AGGREGATION

3. INDIVIDUAL-COUNTRY GROWING PERIOD ZONES

4. WITHIN-COUNTRY AGGREGATION

FIG. 3.2

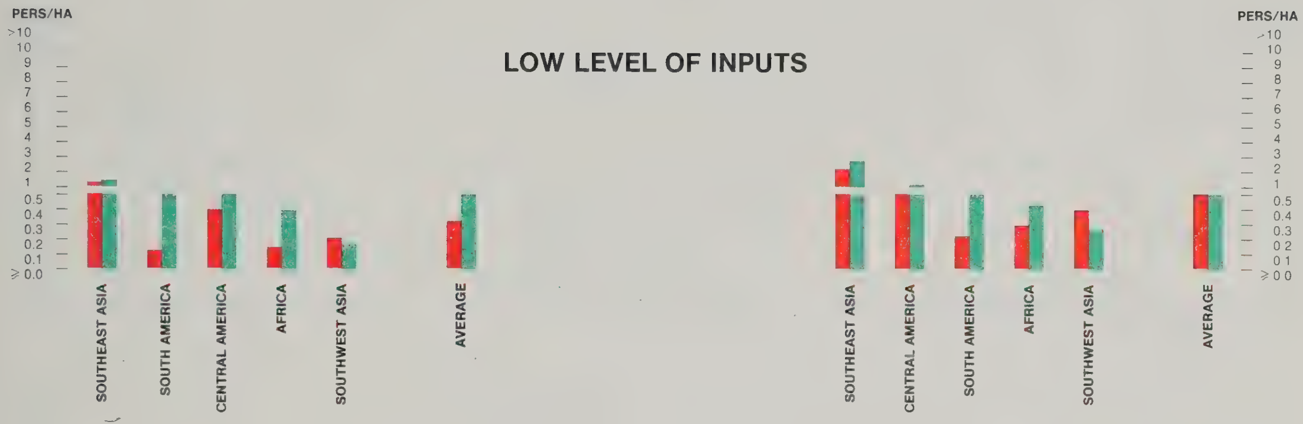
POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES OF
FIVE REGIONS IN THE DEVELOPING WORLD

(DENSITY - PERSON PER HECTARE)

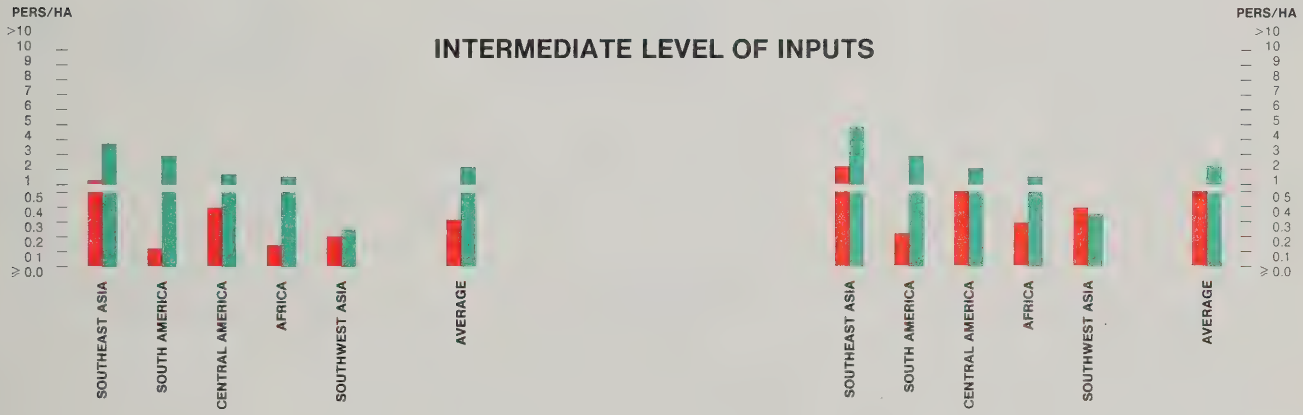
YEAR 1975 **YEAR 2000**

WITH:

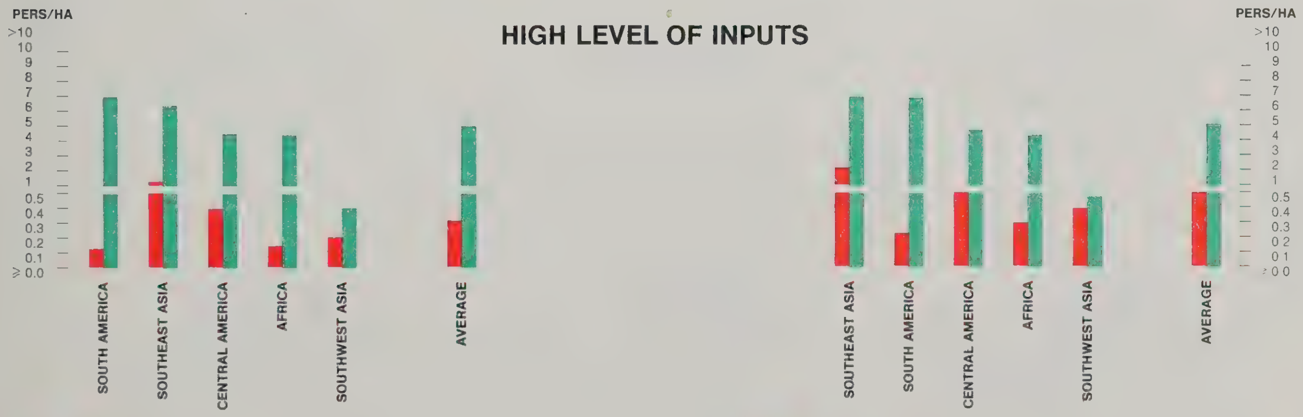
LOW LEVEL OF INPUTS



INTERMEDIATE LEVEL OF INPUTS



HIGH LEVEL OF INPUTS



🟥 PRESENT (YEAR 1975) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

🟥 PROJECTED (YEAR 2000) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 2000) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

FIG 3.3

PRESENT (YEAR 1975) POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES BY
LENGTHS OF GROWING PERIOD ZONES AND MAJOR CLIMATES

(DENSITY - PERSON PER HECTARE)

AFRICA

WITH:

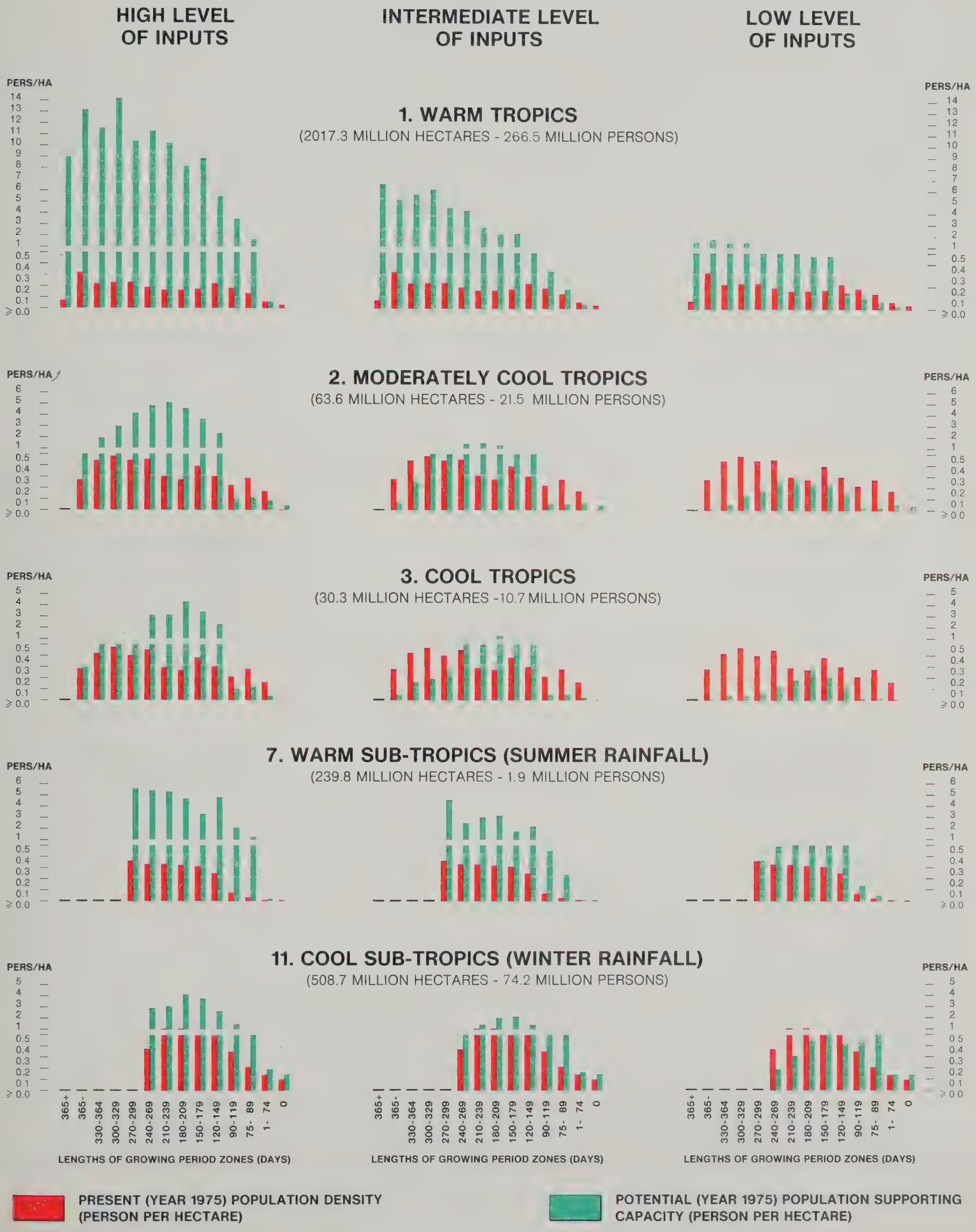


FIG. 3.4 PRESENT (YEAR 1975) POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES BY

LENGTHS OF GROWING PERIOD ZONES AND MAJOR CLIMATES

(DENSITY - PERSON PER HECTARE)

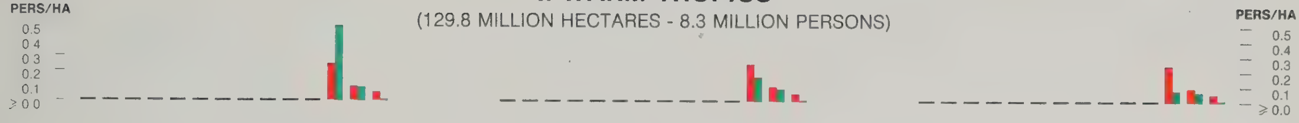
SOUTHWEST ASIA

WITH:

HIGH LEVEL OF INPUTS	INTERMEDIATE LEVEL OF INPUTS	LOW LEVEL OF INPUTS

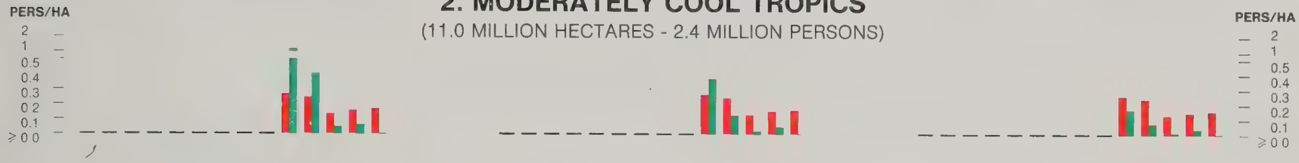
1. WARM TROPICS

(129.8 MILLION HECTARES - 8.3 MILLION PERSONS)



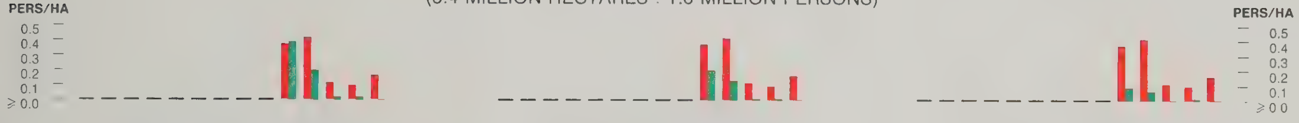
2. MODERATELY COOL TROPICS

(11.0 MILLION HECTARES - 2.4 MILLION PERSONS)



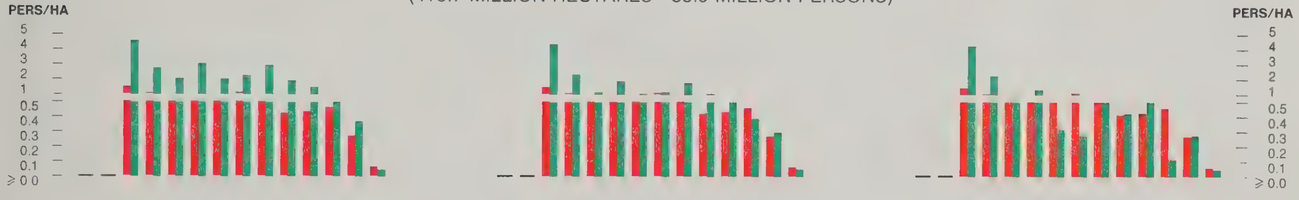
3. COOL TROPICS

(5.4 MILLION HECTARES - 1.6 MILLION PERSONS)



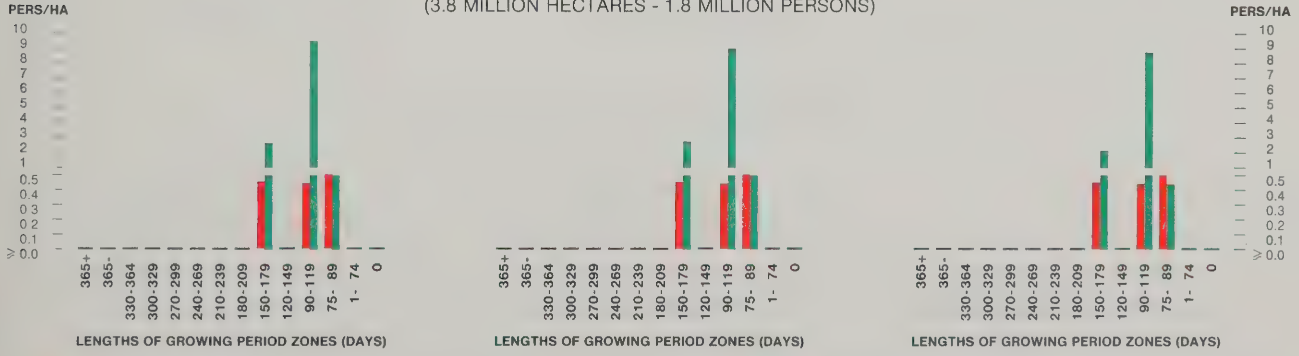
11. COOL SUB-TROPICS (WINTER RAINFALL)

(413.7 MILLION HECTARES - 85.9 MILLION PERSONS)



13. COOL TEMPERATE

(3.8 MILLION HECTARES - 1.8 MILLION PERSONS)



🟥 PRESENT (YEAR 1975) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

FIG 3.5 PRESENT (YEAR 1975) POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES BY

LENGTHS OF GROWING PERIOD ZONES AND MAJOR CLIMATES

(DENSITY - PERSON PER HECTARE)

SOUTH AMERICA

WITH:

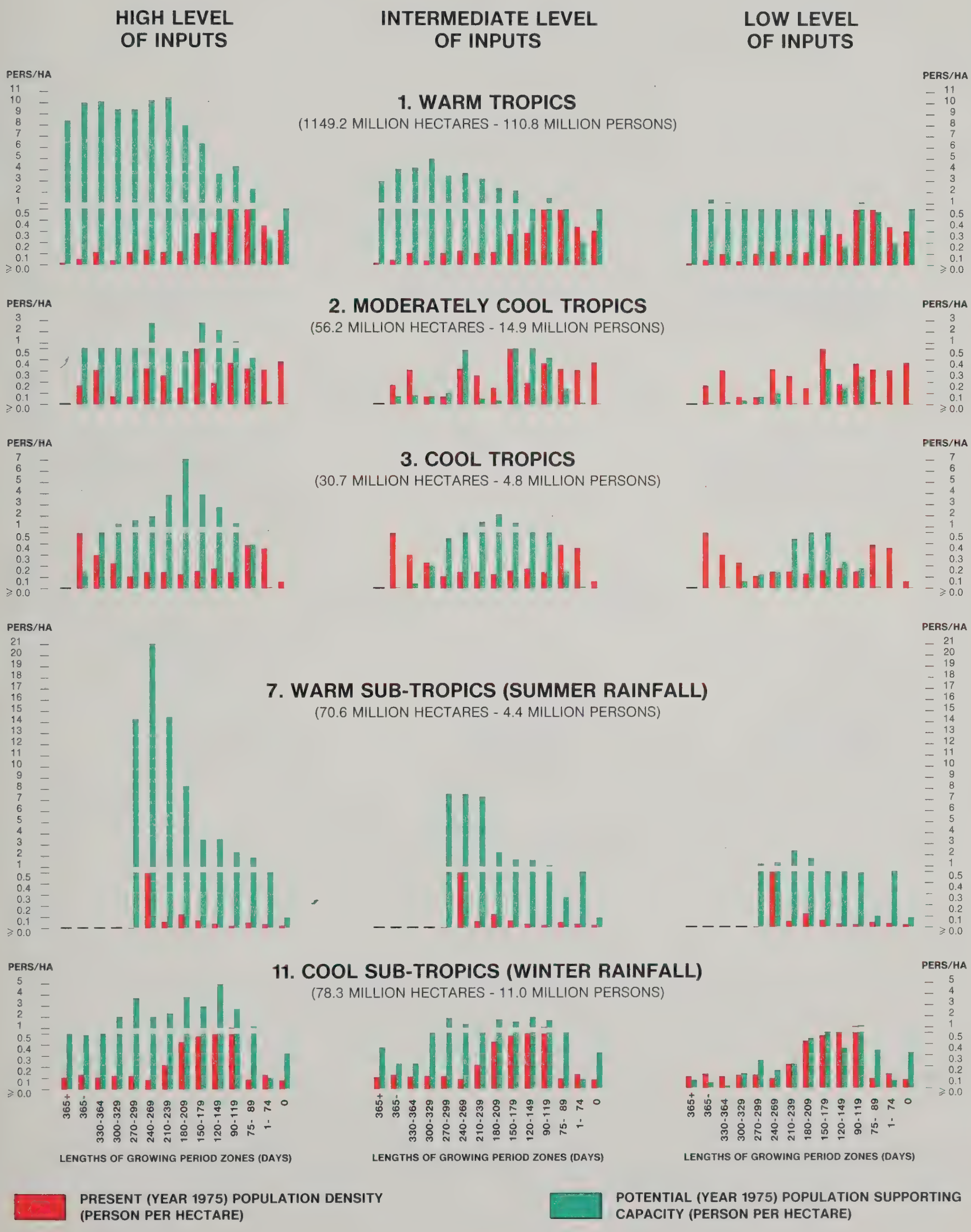


FIG 3.6

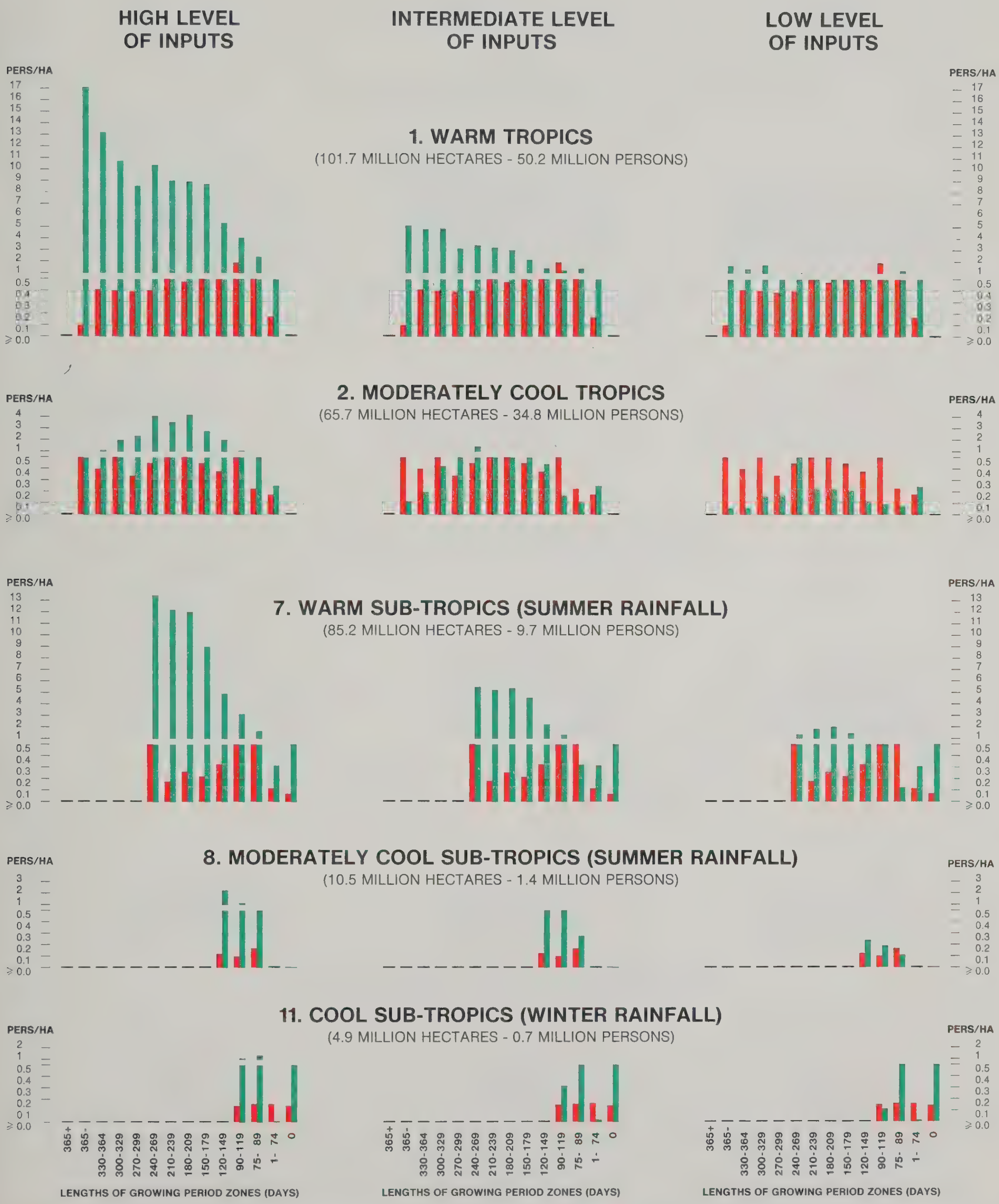
PRESENT (YEAR 1975) POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES BY

LENGTHS OF GROWING PERIOD ZONES AND MAJOR CLIMATES

(DENSITY - PERSON PER HECTARE)

CENTRAL AMERICA

WITH:



🟥 PRESENT (YEAR 1975) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

FIG 3.7 PRESENT (YEAR 1975) POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES BY

LENGTHS OF GROWING PERIOD ZONES AND MAJOR CLIMATES

(DENSITY - PERSON PER HECTARE)

SOUTHEAST ASIA

WITH:

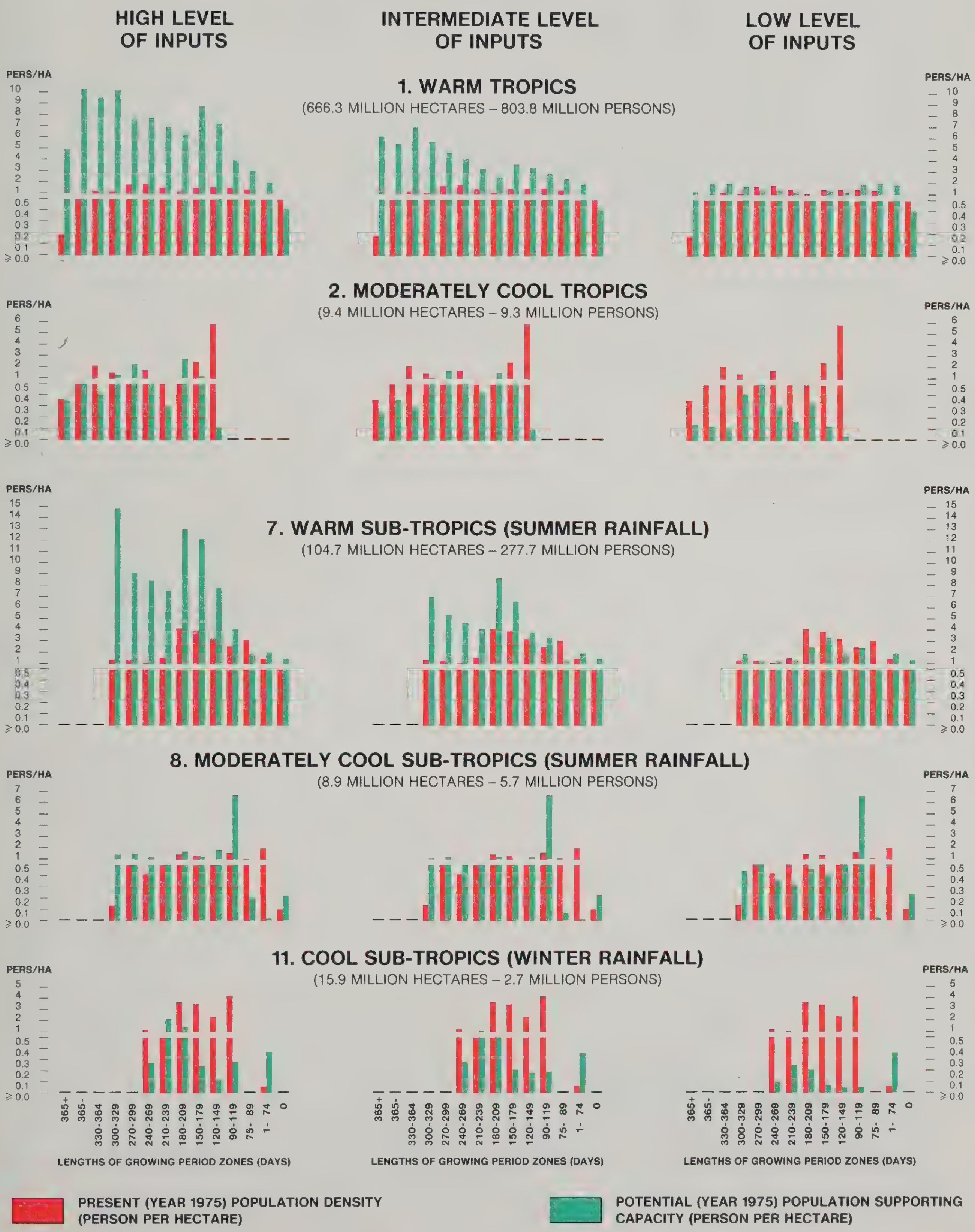


Figure 3.8

TOTAL EXTENT OF CRITICAL INDIVIDUAL-COUNTRY LENGTH OF GROWING PERIOD ZONE AREAS (YEAR 1975)

(MILLION HECTARE)

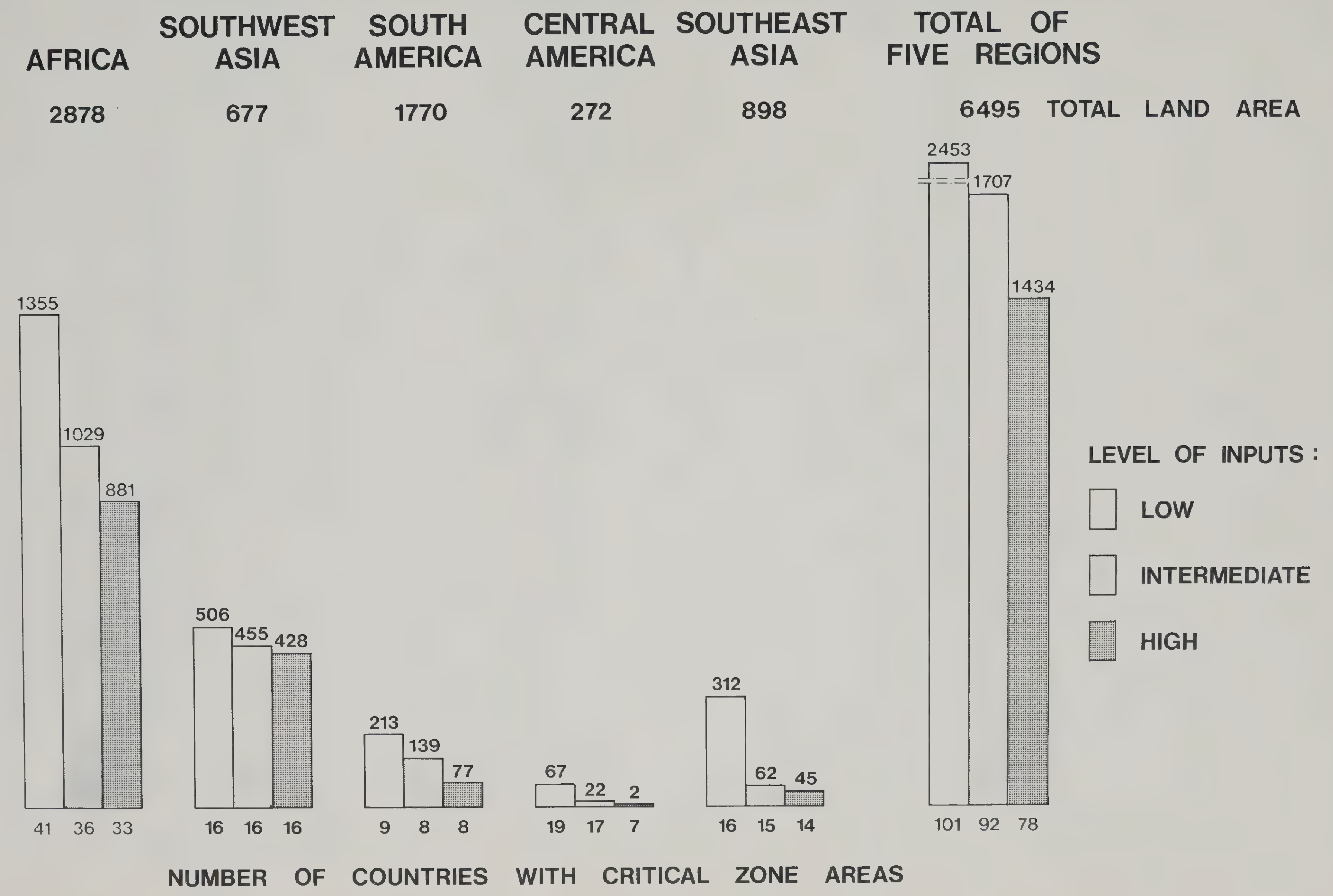


FIG. 3.9

POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES OF

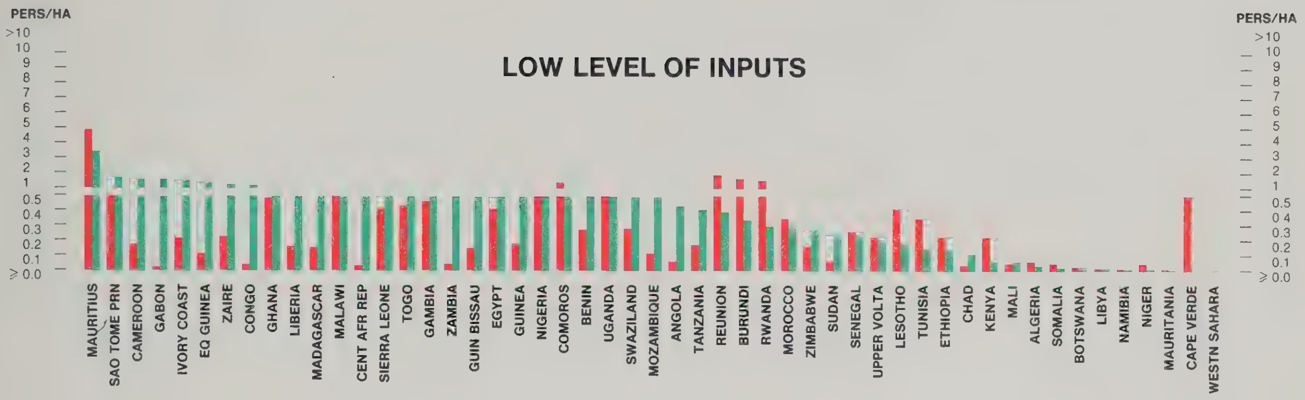
COUNTRIES IN AFRICA

(DENSITY - PERSON PER HECTARE)

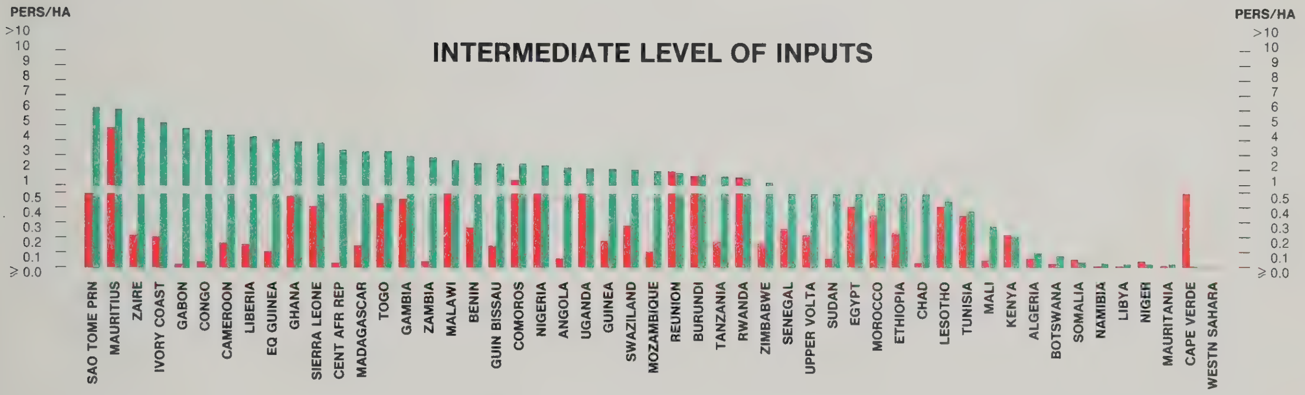
YEAR 1975

WITH:

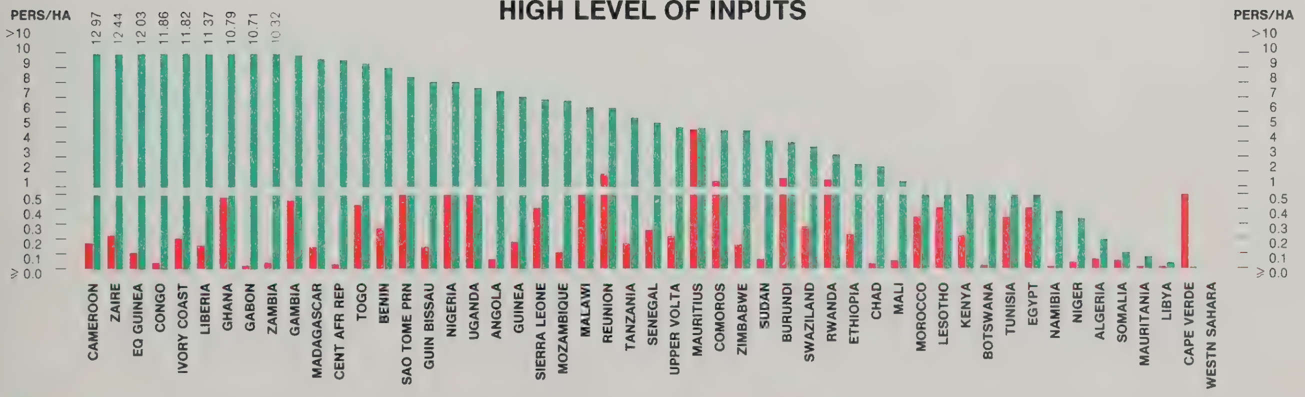
LOW LEVEL OF INPUTS



INTERMEDIATE LEVEL OF INPUTS



HIGH LEVEL OF INPUTS



🟥 **PRESENT (YEAR 1975) POPULATION DENSITY (PERSON PER HECTARE)**

🟩 **POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)**

FIG. 3.9 (CONT.)

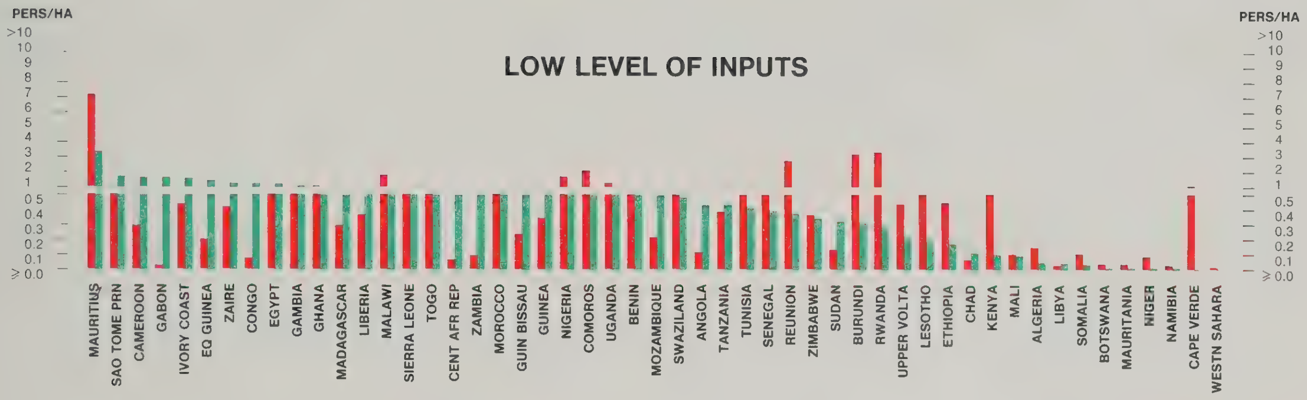
POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES OF

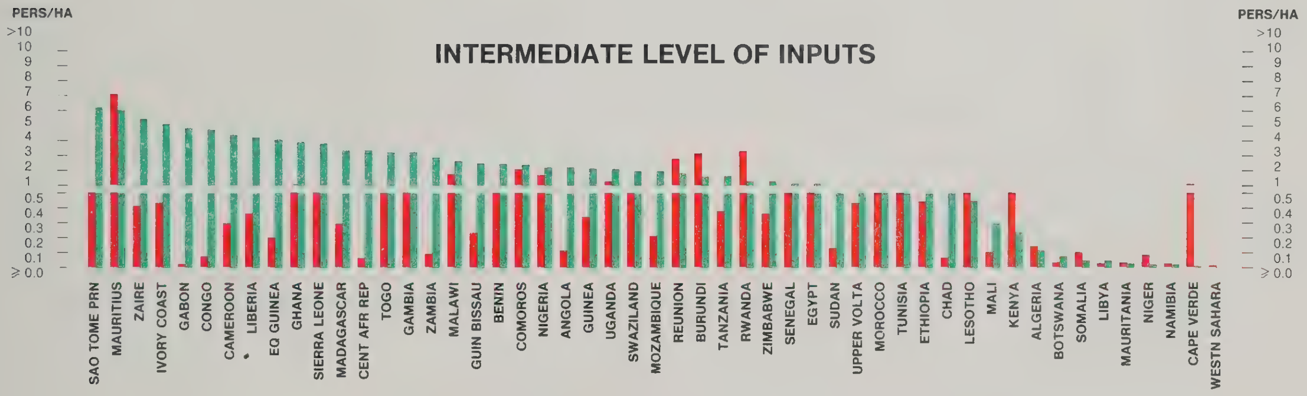
COUNTRIES IN AFRICA

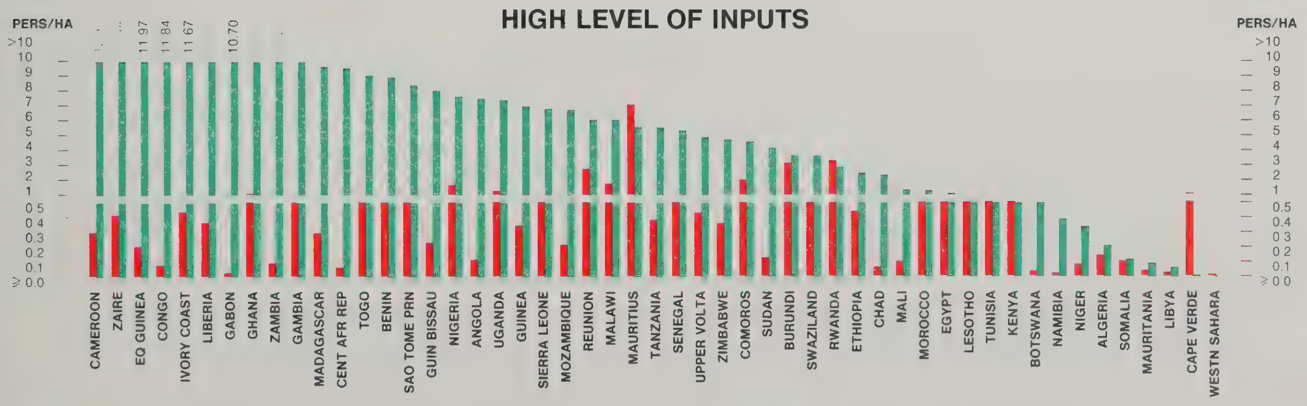
(DENSITY - PERSON PER HECTARE)

YEAR 2000

WITH:


LOW LEVEL OF INPUTS


INTERMEDIATE LEVEL OF INPUTS


HIGH LEVEL OF INPUTS

🟥 PROJECTED (YEAR 2000) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 2000) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

FIG. 3.10

POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES OF

COUNTRIES IN SOUTHWEST ASIA

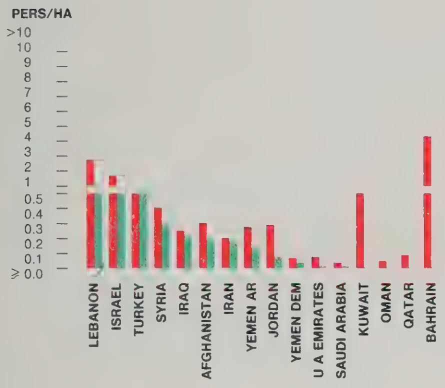
(DENSITY - PERSON PER HECTARE)

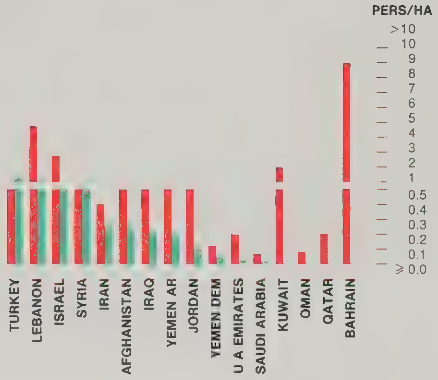
YEAR 1975

YEAR 2000

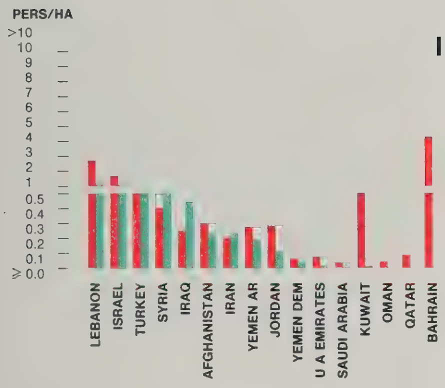
WITH:

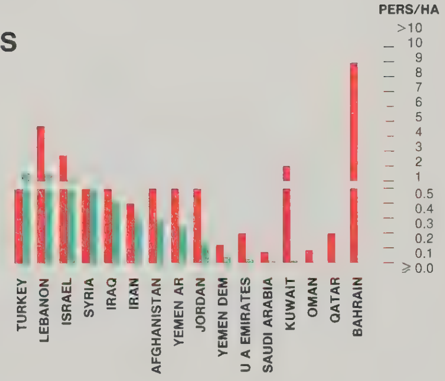
LOW LEVEL OF INPUTS



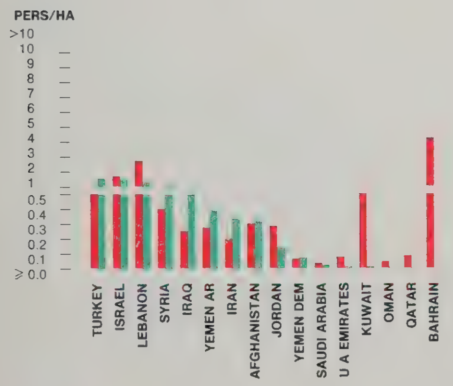


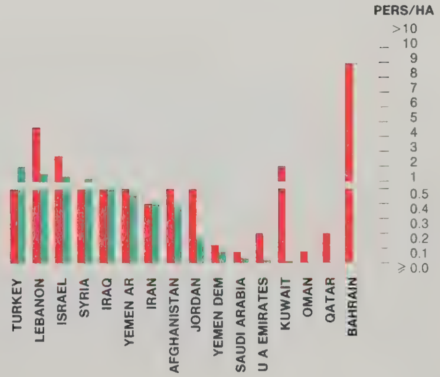
INTERMEDIATE LEVEL OF INPUTS





HIGH LEVEL OF INPUTS





🟥 **PRESENT (YEAR 1975) POPULATION DENSITY (PERSON PER HECTARE)**

🟩 **POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)**

🟥 **PROJECTED (YEAR 2000) POPULATION DENSITY (PERSON PER HECTARE)**

🟩 **POTENTIAL (YEAR 2000) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)**

FIG. 3.11

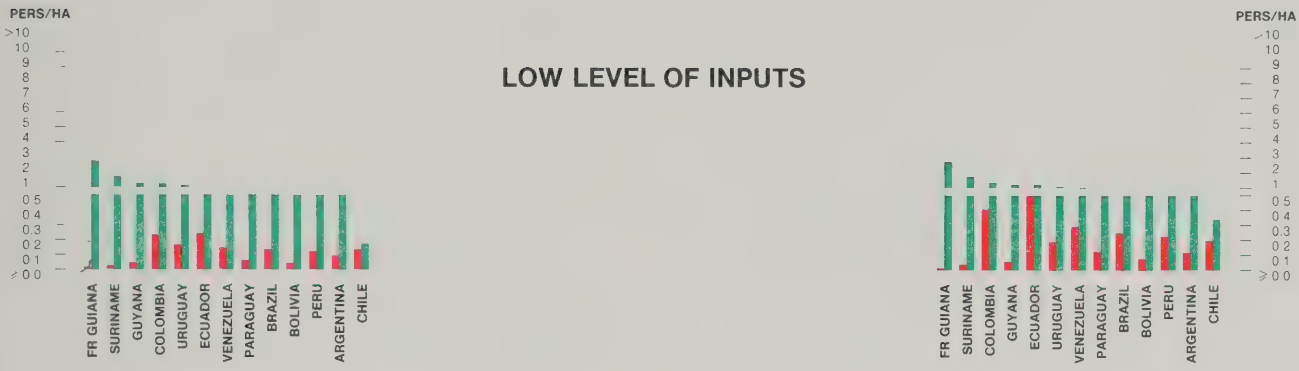
POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES OF COUNTRIES IN SOUTH AMERICA

(DENSITY - PERSON PER HECTARE)

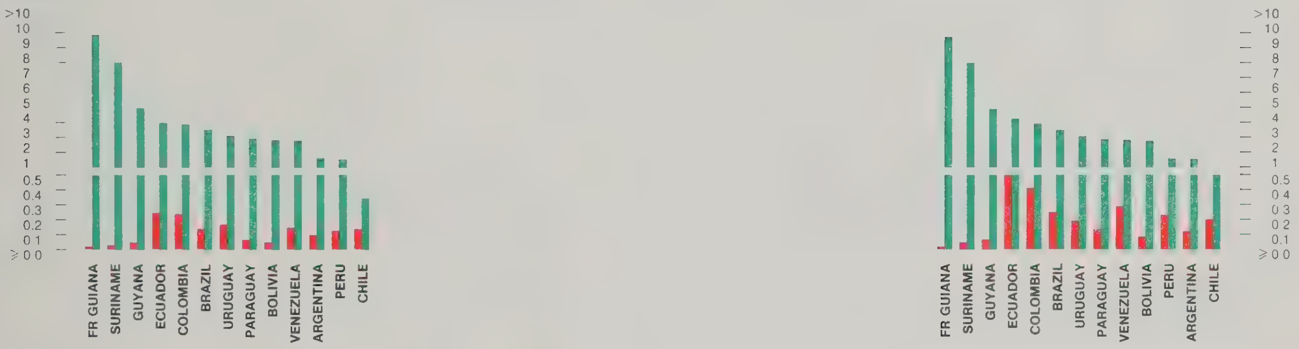
YEAR 1975 **YEAR 2000**

WITH:

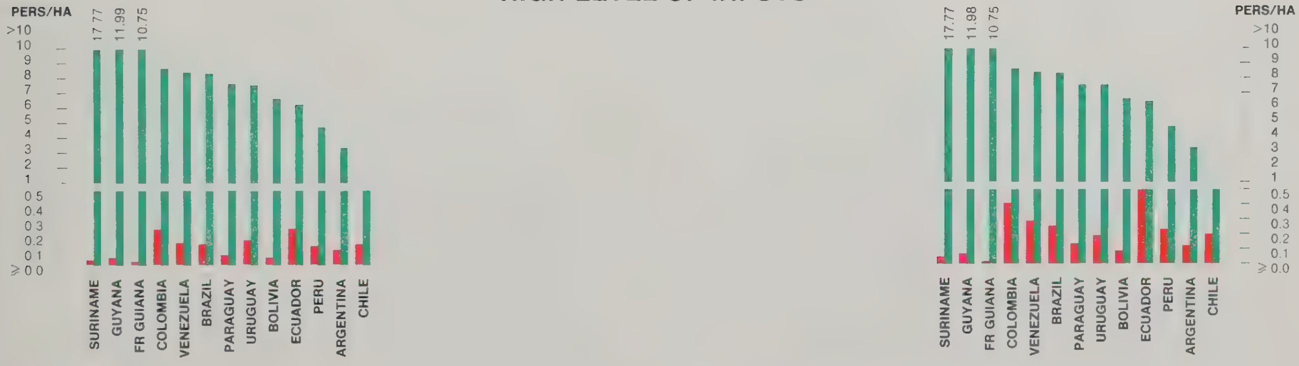
LOW LEVEL OF INPUTS



INTERMEDIATE LEVEL OF INPUTS



HIGH LEVEL OF INPUTS



🟥 PRESENT (YEAR 1975) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

🟥 PROJECTED (YEAR 2000) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 2000) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

FIG 3.12

POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES OF

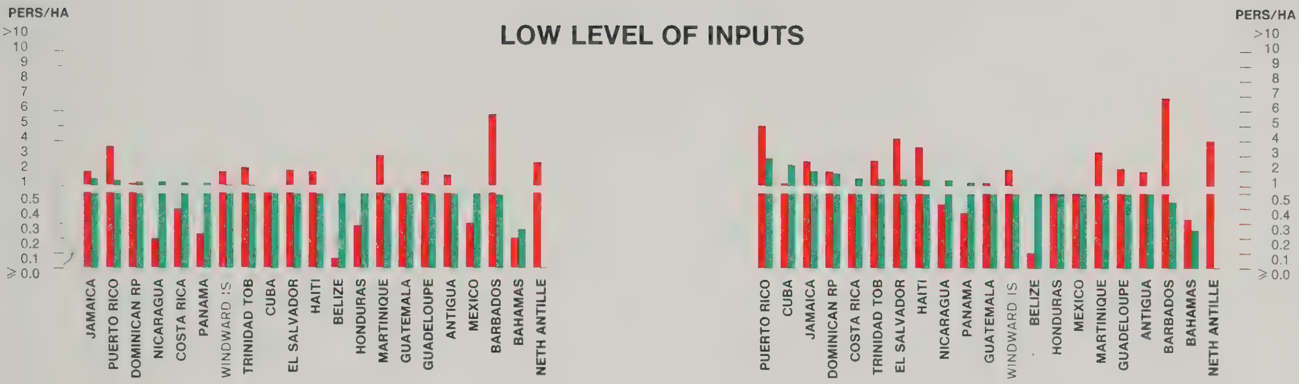
COUNTRIES IN CENTRAL AMERICA

(DENSITY - PERSON PER HECTARE)

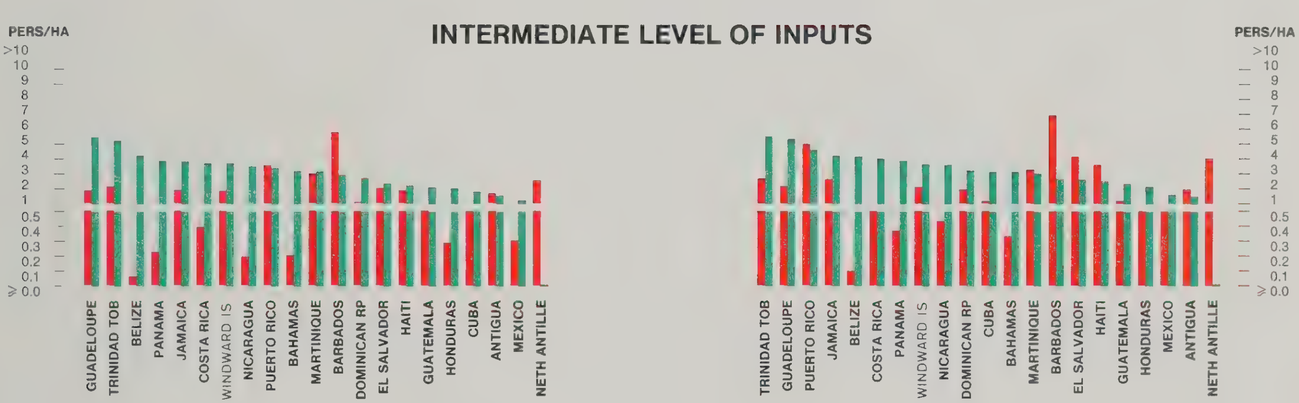
YEAR 1975 **YEAR 2000**

WITH:

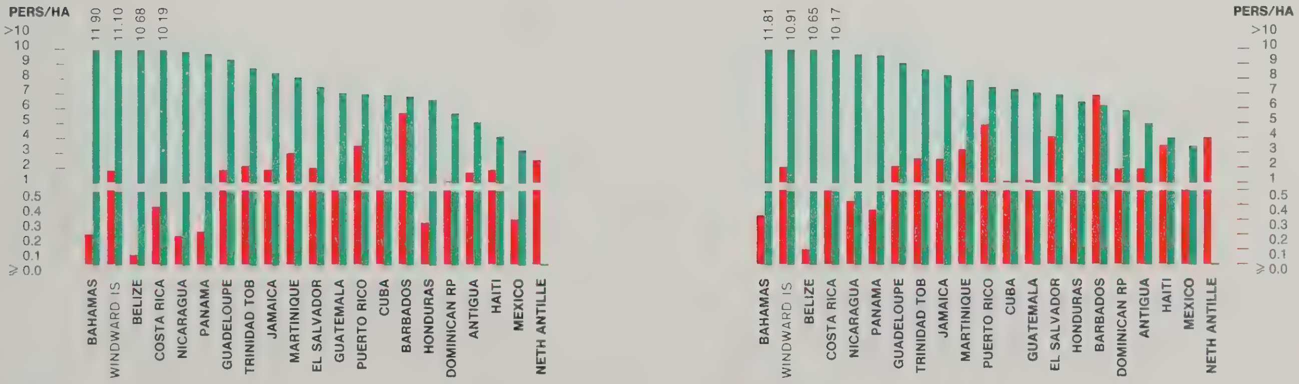
LOW LEVEL OF INPUTS



INTERMEDIATE LEVEL OF INPUTS



HIGH LEVEL OF INPUTS



🟥 PRESENT (YEAR 1975) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

🟥 PROJECTED (YEAR 2000) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 2000) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

FIG 3.13

POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES OF COUNTRIES IN SOUTHEAST ASIA

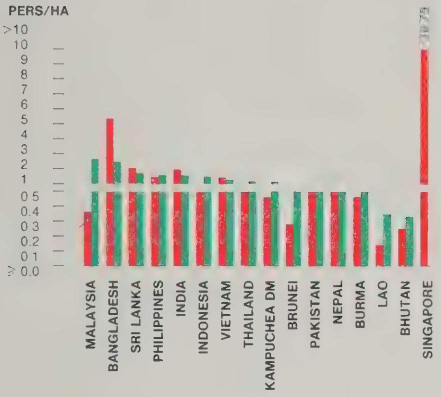
(DENSITY - PERSON PER HECTARE)

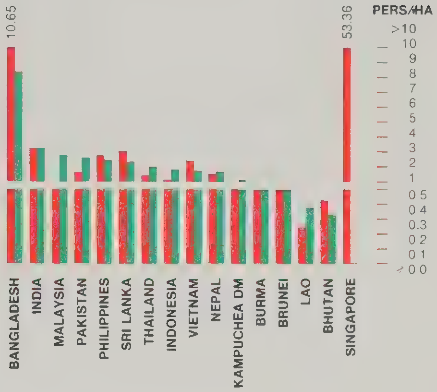
YEAR 1975

YEAR 2000

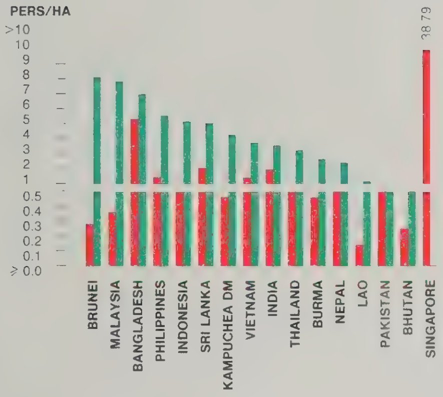
WITH:

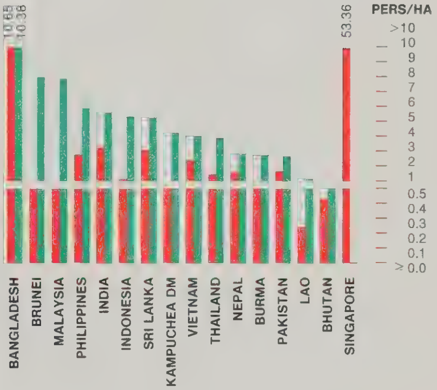
LOW LEVEL OF INPUTS



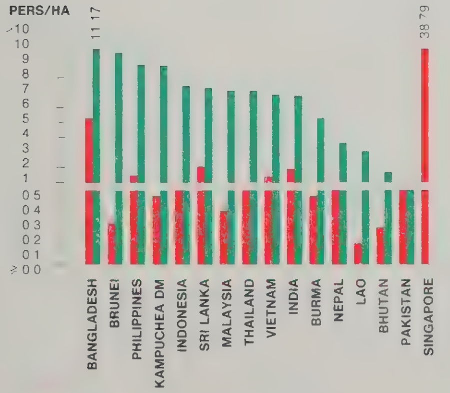


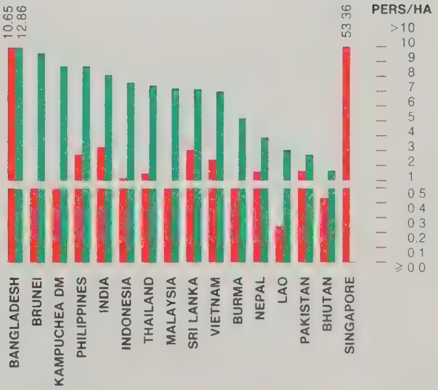
INTERMEDIATE LEVEL OF INPUTS





HIGH LEVEL OF INPUTS





🟥 PRESENT (YEAR 1975) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 1975) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

🟥 PROJECTED (YEAR 2000) POPULATION DENSITY (PERSON PER HECTARE)

🟩 POTENTIAL (YEAR 2000) POPULATION SUPPORTING CAPACITY (PERSON PER HECTARE)

Table 2.1

DISTRIBUTION AND EXTENT (MILLION HA) OF GROUPED GROWING PERIOD ZONES BY MAJOR CLIMATES IN FIVE REGIONS OF THE DEVELOPING WORLD

Major Climates		Grouped Growing Period Zones (days)						Totals
		365-	270-365-	180-269	75-179	1-74	0	
Africa								
Tropics	Warm	19.8	403.3	488.5	491.1	434.0	180.5	2 017.2
	Cool	-	18.4	42.9	22.7	5.8	4.1	93.9
	Cold	-	-	-	-	-	2.9	2.9
Sub-tropics (summer rainfall)	Warm	-	-	0.7	2.7	8.8	227.6	239.8
	Cool	-	-	0.6	1.8	1.0	6.0	9.4
	Cold	-	-	-	-	-	0.2	0.2
Sub-tropics (winter rainfall)	Cool	-	-	14.8	27.1	38.3	428.5	508.7
	Cold	-	-	-	-	-	6.0	6.0
Total		19.8	421.7	547.5	545.4	487.9	855.8	2 878.1
Southwest Asia								
Tropics	Warm	-	-	-	6.1	15.4	108.3	129.8
	Cool	-	-	-	13.6	1.3	1.5	16.4
Sub-tropics (winter rainfall)	Cool	-	2.3	20.2	75.4	55.9	259.9	413.7
	Cold	-	-	-	-	-	100.2	100.2
Temperate	Cool	-	-	-	3.8	-	-	3.8
	Cold	-	-	-	-	-	13.5	13.5
Total		-	2.3	20.2	98.9	72.6	483.4	677.4
South America								
Tropics	Warm	110.4	669.1	222.0	126.9	17.2	3.6	1 149.2
	Cool	-	36.7	6.5	27.0	3.6	13.1	86.9
	Cold	-	-	-	-	-	31.3	31.3
Sub-tropics (summer rainfall)	Warm	-	0.6	20.9	33.5	8.9	6.7	70.6
	Warm/Mod. Cool	-	102.5	25.9	-	-	-	128.4
	Cool	5.8	45.5	26.8	23.2	15.1	16.5	132.9
	Cold	-	-	-	-	-	17.1	17.1
Sub-tropics (winter rainfall)	Cool	3.5	3.0	4.0	9.7	23.4	34.7	78.3
	Cold	-	-	-	-	-	4.9	4.9
Temperate	Cool	-	-	-	10.1	46.4	6.6	63.1
	Cold	-	-	-	-	-	7.5	7.5
Total		119.7	857.4	306.1	230.4	114.6	142.0	1 770.2

Major Climates		Grouped Growing Period Zones (days)						Totals
		365+	270-365-	180-269	75-179	1-74	0	
Central America								
Tropics	Warm	-	36.7	39.6	23.8	1.6	-	101.7
	Cool	-	5.3	24.8	24.4	11.8	-	66.3
	Cold	-	-	-	-	-	0.7	0.7
Sub-tropics (summer rainfall)	Warm	-	-	1.2	3.5	48.2	32.2	85.1
	Warm/Mod. Cool	-	-	2.3	0.1	-	-	2.4
	Cool	-	-	-	10.5	-	-	10.5
Sub-tropics (winter rainfall)	Cool	-	-	-	0.9	0.6	3.4	4.9
Total		-	42.0	67.9	63.2	62.2	36.3	271.6
Southeast Asia								
Tropics	Warm	83.0	191.8	216.8	153.9	15.6	5.2	666.3
	Cool	3.4	8.3	2.0	0.1	-	-	13.8
	Cold	-	-	-	-	-	2.3	2.3
Sub-tropics (summer rainfall)	Warm	-	12.8	25.6	44.6	23.9	33.8	140.7
	Cool	-	5.3	4.7	3.0	-	0.2	13.2
	Cold	-	-	-	-	-	18.8	18.8
Sub-tropics (winter rainfall)	Cool	-	-	0.5	0.3	15.1	-	15.9
	Cold	-	-	-	-	-	26.6	26.6
Total		86.4	218.2	249.6	201.9	54.6	86.9	897.6
Total of Five Regions								
Tropics	Warm	213.2	1 300.9	966.9	801.8	483.8	297.6	4 064.2
	Cool	3.4	68.7	76.2	87.8	22.5	18.7	277.3
	Cold	-	-	-	-	-	37.2	37.2
Sub-tropics (summer raifall)	Warm	-	13.4	48.4	84.3	89.8	300.3	536.2
	Warm/Mod. Cool	-	102.5	28.2	0.1	-	-	130.8
	Cool	5.8	50.8	32.1	38.5	16.1	22.7	166.0
	Cold	-	-	-	-	-	36.1	36.1
Sub-tropics (winter rainfall)	Cool	3.5	5.3	39.5	113.4	133.3	726.5	1 021.5
	Cold	-	-	-	-	-	137.7	137.7
Temperate	Cool	-	-	-	13.9	46.4	6.6	66.9
	Cold	-	-	-	-	-	21.0	21.0
Total		225.9	1 541.6	1 191.3	1 139.8	791.9	1 604.4	6 494.9

Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

Table 2.2 DISTRIBUTION AND EXTENT (MILLION HA) OF MAJOR SOILS, PHASES, TEXTURES AND SLOPES IN FIVE REGIONS OF THE DEVELOPING WORLD

	AFRICA		SOUTHWEST ASIA		SOUTH AMERICA		CENTRAL AMERICA		SOUTHEAST ASIA		TOTAL	
	Area	Percent	Area	Percent	Area	Percent	Area	Percent	Area	Percent	Area	Percent
Major soil units [1]												
Lithosols	372.5	12.9	173.9	25.6	185.8	10.5	43.6	16.0	90.4	10.1	866.2	13.3
Ferralsols	319.8	11.1	-	-	425.8	24.1	0.8	0.3	15.9	1.8	762.3	11.7
Yermosols	373.8	13.0	190.2	28.0	56.2	3.2	20.4	7.5	30.1	3.3	670.7	10.3
Acrisols	92.0	3.2	2.1	0.3	290.2	16.4	14.9	5.5	197.7	22.0	596.9	9.2
Arenosols	304.4	10.6	37.0	5.5	90.5	5.1	0.2	0.1	24.8	2.8	456.9	7.0
Luvisols	231.2	8.0	10.2	1.5	80.3	4.5	31.9	11.8	97.6	10.9	451.2	7.0
Regosols	263.1	9.2	89.9	13.3	41.9	2.4	15.7	5.8	27.5	3.0	438.1	6.8
Cambisols	99.7	3.5	20.2	3.0	51.6	2.9	24.1	8.8	122.3	13.6	317.9	4.9
Gleysols	130.4	4.5	2.6	0.4	117.9	6.7	8.6	3.2	49.5	5.5	309.0	4.8
Fluvisols	101.3	3.5	15.7	2.3	64.5	3.6	5.4	2.0	54.6	6.1	241.5	3.7
Vertisols	98.8	3.4	5.7	0.9	24.9	1.4	13.2	4.8	57.9	6.5	200.5	3.1
Xerosols	85.4	3.0	40.7	6.0	37.7	2.1	11.4	4.2	12.6	1.4	187.8	2.9
Nitosols	98.4	3.4	-	-	36.5	2.1	11.6	4.3	37.5	4.2	184.0	2.8
Solonchaks	50.1	1.8	49.0	7.2	23.9	1.4	0.4	0.1	17.3	1.9	140.7	2.2
Others	52.4	1.8	16.1	2.4	235.6	13.2	69.4	25.6	56.0	6.2	429.5	6.6
Miscellaneous land units [2] (MLU's)	204.8	7.1	24.1	3.6	6.9	0.4	-	-	5.9	0.7	241.7	3.7
Total	2 878.1		677.4		1 770.2		271.6		897.6		6 494.9	
Phases and all MLU's												
Stony	319.2	11.1	128.0	18.9	21.7	1.2	0.2	0.1	13.7	1.5	482.8	7.4
Lithic	62.7	2.2	46.5	6.9	1.9	0.1	46.6	17.2	78.0	8.7	235.7	3.6
Petric	83.6	2.9	-	-	47.3	2.7	-	-	7.0	0.8	137.9	2.1
Saline	23.0	0.8	3.6	0.5	36.3	2.1	1.3	0.5	27.3	3.0	91.5	1.4
Cerrado	-	-	-	-	73.1	4.1	-	-	-	-	73.1	1.1
Petrocalcic	39.3	1.4	11.0	1.6	16.0	0.9	2.4	0.9	-	-	68.7	1.1
Petroferric	48.4	1.7	-	-	-	-	-	-	9.6	1.1	58.0	0.9
Sodic	16.1	0.5	0.4	0.1	24.9	1.4	-	-	0.1	0.1	41.5	0.6
Petrogypsic	11.7	0.4	11.7	1.7	-	-	-	-	-	-	23.4	0.4
Duripan	1.1	0.1	-	-	-	-	0.4	0.1	-	-	1.5	0.1
Sodic/Saline	1.0	0.1	-	-	-	-	-	-	0.6	0.1	1.6	0.1
Shifting sand/dunes	223.0	7.7	41.8	6.2	0.7	0.1	-	-	13.1	1.4	278.6	4.3
Salt flats	3.5	0.1	6.7	1.0	5.7	0.3	-	-	-	-	15.9	0.2
Rock debris	104.4	3.6	47.7	7.0	-	-	-	-	25.6	2.8	177.7	2.7
Ice caps/glaciers	-	-	0.6	0.1	-	-	-	-	5.9	0.7	6.5	0.1
No phase (including water bodies)	1 941.1	67.4	379.4	56.0	1 542.6	87.1	220.7	81.2	716.7	79.8	4 800.5	73.9
Total	2 878.1		677.4		1 770.2		271.6		897.6		6 494.9	
Texture classes												
Coarse	867.0	30.1	170.5	25.1	251.6	14.2	18.4	6.8	90.6	10.1	1 398.1	21.5
Medium	1 571.4	54.6	363.3	53.6	694.3	39.2	167.4	61.6	502.8	56.0	3 299.2	50.8
Fine	439.7	15.3	143.6	21.3	824.3	46.6	85.8	31.6	304.2	33.9	1 797.6	27.7
Total	2 878.1		677.4		1 770.2		271.6		897.6		6 494.9	
Slope classes												
0 - 8 percent	1 659.4	57.7	302.5	44.6	923.0	52.1	94.0	34.6	361.2	40.2	3 340.1	51.4
8 - 30 percent	981.2	34.0	214.1	31.6	528.3	29.8	109.7	40.4	273.8	30.5	2 107.1	32.5
> 30 percent	237.5	8.3	160.8	23.8	318.9	18.1	67.9	25.0	262.6	29.3	1 047.7	16.1
Total	2 878.1		677.4		1 770.2		271.6		897.6		6 494.9	

[1] includes all extents, whether occuring as dominant soil, or as associated soil or as inclusions.

[2] excludes soil-designated miscellaneous land units.

Table 2.3 Present Crop Distribution (Rainfed and Irrigated) by Major Climate and Length of Growing Period Zone.

Length of growing period (days)	% Zone area occupied	Climate I: Warm Tropics				
		Africa	Southwest Asia	South America	Central America	Southeast Asia
365^{+}(N)[1] humid	>50					Rice
	25-50	Cassava		Maize		
	10-25	Maize/Banana/ Rice/Groundnut		Groundnut/ Banana		Oil Palm/ Maize
	5-10	Beans/ Oilpalm		Cassava/ Rice		
270-365 days (N) humid	>50					Rice
	25-50	Cassava		Maize	Maize	
	10-25	Maize/Rice		Rice/ Sugarcane/ Beans	Sugarcane	Maize
	5-10	Groundnut/Banana/ Oilpalm		Soybean/ Cassava	Rice/Beans/ Banana	Cassava
180-269 days (N) subhumid	>50					Rice
	25-50	Maize		Maize/Rice	Maize/ Sugarcane	
	10-25	Millet/ Groundnut/ Cassava		Beans		
	5-10	Beans/Rice/ Sorghum		Cassava/ Sugarcane	Beans/Rice	Maize
75-179 days (N) arid/semi-arid/ subhumid	>50					
	25-50	Millet		Maize	Maize/ Sugarcane	Sorghum/Rice
	10-25	Banana/ Beans/Maize		Beans/Cassava/ Sorghum		Millet/ Groundnut
	5-10			Rice/Banana	Beans/ Sorghum	Wheat
1-74 days (N) arid	>50					Millet
	25-50	Sorgum/Millet		Maize	Wheat/ Sorghum	
	10-25	Beans/Maize		Rice/ Sugarcane	Soybean	Sorghum/Wheat
	5-10	Banana		Banana/Beans/ Sorghum	Beans/Maize	Groundnut/ Rice
0 days dry	>50	Sorghum	Sorghum			
	25-50		Millet	Rice/ Sugarcane		Millet
	10-25	Millet	Maize	Maize		Wheat/Rice
	5-10	Maize/Banana		Wheat		Sorghum
1-74 days (I)[2] arid	>50					
	25-50	Maize	Sorghum/ Millet	Maize/Beans/ Cassava		
	10-25	Sorghum/Banana/ Cassava		Sugarcane		
	5-10	Beans/Millet	Barley/Maize			
75-179 days (I) arid/ semi-arid	>50		Sorghum			
	25-50	Maize	Millet	Maize/Beans		
	10-25	Millet/Sorghum/ Cassava	Maize	Sugarcane/ Cassava		
	5-10	Banana				
180-209 days (I) subhumid	>50					
	25-50			Maize/Cassava		
	10-25			Beans		
	5-10			Soybean		

Table 2.3 contd.

Length of growing period (days)	% Zone area occupied	Climate 2 and 3: Moderately Cool and Cool Tropics				
		Africa	Southwest Asia	South America	Central America	Southeast Asia
365^{+} (N) humid	>50					
	25-50					
	10-25					Maize
	5-10					
$270\text{-}365^{-}$ days (N) humid	>50	Maize				Rice
	25-50				Maize	Maize
	10-25	Beans		Maize/Banana/Rice	Beans/Rice/Banana	
	5-10	Wheat		Potatoes/Beans Sorghum		Cassava
180-269 days (N) subhumid	>50				Maize	
	25-50	Maize		Maize		Rice
	10-25	Beans/Wheat/Sorghum		Rice	Sorghum/Beans	Maize
	5-10			Potato/Beans/Barley		Cassava/Banana
75-179 days (N) arid/semi-arid/subhumid	>50				Maize	
	25-50	Maize/Beans	Sorghum/Millet	Maize		Rice/Sorghum
	10-25	Wheat/Potato		Potato/Sugarcane	Beans/Sorghum	Groundnut
	5-10	Sorghum	Wheat/Barley/Maize	Wheat/Barley/Banana/Beans Rice		Millet/Maize
1-74 days (N) arid	>50	Maize			Maize	
	25-50			Maize	Beans	
	10-25	Wheat/Beans		Sugarcane/Rice		
	5-10	Potato/Sorghum		Wheat/Banana/Beans/Potato/Barley		
0 days dry	>50		Sorghum			
	25-50	Beans/Potato	Wheat	Maize		
	10-25			Barley/Potato/Wheat		
	5-10		Millet	Sugarcane/Rice		
1-74 days (I) arid	>50	Wheat	Sorghum			
	25-50			Barley/Potato		
	10-25	Potato	Millet/Wheat			
	5-10			Wheat/Maize		
75-179 days (I) arid/semi-arid	>50	Wheat	Sorghum			
	25-50			Barley		
	10-25		Millet/Wheat	Maize/Potato/Wheat		
	5-10	Potato	Barley			

Table 2.3 contd.

Length of growing period (days)	% Zone area occupied	Climate 5 and 6: Warm and Moderately Cool Sub-tropics (Summer Rainfall)				
		Africa	Southwest Asia	South America	Central America	Southeast Asia
270-365$^+$ (N) humid	>50			Wheat		
	25-50					
	10-25			Maize/Sorghum		
	5-10			Soybean		
180-269 days (N) subhumid	>50					
	25-50			Soybean/Maize		
	10-25			Rice		
	5-10			Wheat		
75-179 days (N) arid/semi-arid/subhumid	>50				Maize	
	25-50			Wheat		
	10-25			Beans/Maize	Sugarcane	
	5-10			Rice	Beans	
75-179 days (I) arid/semi-arid	>50			Wheat		
	25-50			Maize		
	10-25			Sorghum		
	5-10					
180-209 days (I) subhumid	>50					
	25-50			Wheat/ Sorghum		
	10-25			Maize		
	5-10			Millet		

Table 2.3 contd.

Length of growing period (days)	% Zone area occupied	Climate 7: Warm Sub-tropics (summer rainfall)				
		Africa	Southwest Asia	South America	Central America	Southeast Asia
270-365 days (N) humid	>50	Maize		Sorghum		Rice
	25-50					
	10-25	Groundnut				
	5-10			Maize/ Sugarcane		Maize/Wheat
180-269 days (N) subhumid	>50	Maize			Maize	
	25-50			Sugarcane/ Sorghum		Rice
	10-25			Wheat/Maize/ Soybean	Sugarcane	Wheat/Maize
	5-10	Groundnut			Sorghum	Sugarcane Barley
75-179 days (N) arid/semi-arid/subhumid	>50				Maize	
	25-50				Sorghum	Wheat
	10-25					Rice/Millet
	5-10				Soybean/ Beans	Maize/Barley/ Sorghum/ Sugarcane
1-74 days (N) arid	>50					
	25-50				Maize	Wheat/Millet
	10-25				Sorghum/ Beans/Wheat	
	5-10				Soybean	Rice/Maize/ Sugarcane
0 days dry	>50			Maize		Wheat
	25-50	Sorghum/Maize		Sorghum	Wheat	
	10-25	Beans		Wheat	Maize/Beans	Rice/Millet
	5-10				Soybean/ Sorghum	Sorghum/ Sugarcane
1-74 days (I) arid	>50	Sorghum		Wheat		
	25-50					
	10-25	Maize/Beans		Maize/ Sorghum		
	5-10	Millet				
75-179 days (I) arid/semi-arid	>50	Maize				
	25-50	Sorghum		Sorghum		
	10-25			Maize/Wheat/ Sugarcane		
	5-10	Beans/ Groundnut		Soybean/ Millet		
180-209 days (I) subhumid	>50					
	25-50			Sorghum/Wheat		
	10-25			Maize		
	5-10			Soybean/Millet		

Table 2.3 contd.

Length of growing period (days)	% Zone area occupied	Climate 8 and 9: Moderately Cool and Cool Sub-tropics (Summer Rainfall)				
		Africa	Southwest Asia	South America	Central America	Southeast Asia
365$^+$ (N) humid	>50					
	25-50			Maize/Soybean		
	10-25			Wheat		
	5-10			Beans		
270-365$^-$ days (N) humid	>50					
	25-50			Wheat		Maize/Wheat
	10-25			Maize		
	5-10			Sorghum/ Soybean Barley		
180-269 days (N) subhumid	>50			Wheat		
	25-50	Maize/Wheat				Wheat
	10-25	Beans/ Sorghum		Sorghum		Maize/Millet
	5-10			Barley		Barley
75-179 days (N) arid/semi-arid/ subhumid	>50					
	25-50				Maize	Maize/Rice
	10-25				Beans/ Sorghum/ Soybean	Wheat
	5-10				Wheat	Millet/ Barley
1-74 days (N) arid	>50					Wheat
	25-50					Maize
	10-25					
	5-10					
0 days dry	>50	Wheat		Maize		Wheat
	25-50				Maize/Beans	
	10-25			Sorghum/ Wheat	Wheat	
	5-10	Potato		Sugarcane	Sorghum	Beans/Maize
1-74 days (I) arid	>50			Wheat		
	25-50	Wheat/Maize				
	10-25	Sorghum/ Beans		Maize/ Sorghum		
	5-10					
75-179 days (I) arid/ semi-arid	>50			Wheat		
	25-50	Maize/Wheat				
	10-25	Beans/ Sorghum		Maize/ Sorghum		
	5-10			Barley		
180-209 days (I) subhumid	>50			Wheat		
	25-50					
	10-25			Sorghum		
	5-10			Barley		

Table 2.3 contd.

Length of growing period (days)	% Zone area occupied	Climate 11: Cool Sub-tropics (Winter Rainfall)				
		Africa	Southwest Asia	South America	Central America	Southeast Asia
365^{+} (N) humid	>50			Wheat		
	25-50			Potato		
	10-25					
	5-10			Barley		
270-365^{-} days (N) humid	>50			Wheat		
	25-50		Wheat/Rice/Maize			
	10-25		Barley	Barley/Potato		
	5-10					
180-269 days (N) subhumid	>50	Wheat	Wheat	Wheat		
	25-50	Barley				Wheat/Maize
	10-25		Barley/Maize			
	5-10		Rice	Beans/Barley/Potato		Sugarcane/Rice/Barley
75-179 days (N) arid/semi-arid/subhumid	>50	Wheat	Wheat	Wheat	Wheat	Wheat
	25-50	Barley	Barley		Barley	
	10-25			Beans/Maize		Barley/Maize
	5-10			Potato/Rice/Barley	Sorghum	Rice/Sugarcane
1-74 days (N) arid	>50		Wheat	Wheat	Wheat	Wheat
	25-50				Barley	
	10-25		Barley	Beans/Maize		Sorghum
	5-10		Rice	Potato/Barley/Rice	Sorghum	Maize
0 days dry	>50	Wheat	Wheat		Wheat	Wheat
	25-50			Maize	Barley	
	10-25	Barley	Barley	Wheat/Potato		
	5-10		Rice	Beans/Barley/Rice	Sorghum	Sorghum
1-74 days (I) arid	>50	Barley	Wheat	Wheat		
	25-50	Wheat	Barley			
	10-25			Maize		
	5-10		Rice	Potato/Barley		
75-179 days (I) arid/semi-arid	>50		Wheat	Wheat		
	25-50	Wheat/Barley	Barley			
	10-25	Potato		Barley		
	5-10			Maize/Potato		

Table 2.3 contd.

Length of growing period (days)	% Zone area occupied	Climate 13 and 14: Cool Temperate				
		Africa	Southwest Asia	South America	Central America	Southeast Asia
75-179 days (N) arid/semi-arid/ subhumid	>50		Wheat	Wheat		
	25-50			Potato		
	10-25		Barley			
	5-10		Maize	Maize/ Barley		
1-74 days (N) arid	>50			Wheat		
	25-50			Potato		
	10-25			Barley		
	5-10					
0 days dry	>50			Wheat		
	25-50			Potato		
	10-25					
	5-10			Barley/ Maize		

1. (N) = normal length of growing period zone.
2. (I) = Intermediate length of growing period zone.

TABLE 2.4 PRESENT AND POTENTIAL POPULATIONS AND CONTRIBUTION OF IRRIGATION TO POTENTIAL POPULATION SUPPORTING CAPACITY BY LOCATION AND LEVEL OF INPUTS

AFRICA (YEAR 1975)

LOCATION	YEAR 1975[1] POP. (mill.)	LOW INPUTS		INTERMEDIATE INPUTS		HIGH INPUTS	
		POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)
ALGERIA	15.7	7.0	30	24.6	9	46.8	< 5
ANGOLA	6.2	53.2	< 5	279.2	< 5	931.3	< 5
BENIN	3.0	6.3	< 5	28.4	< 5	102.2	< 5
BOTSWANA	0.7	0.9	< 5	4.8	< 5	46.3	< 5
BURUNDI	3.9	0.9	< 5	4.6	< 5	10.5	< 5
CAMEROON	7.5	76.8	< 5	209.2	< 5	612.9	< 5
CAPE VERDE	0.3	0.0	< 5	0.0	< 5	0.0	< 5
CENT AFR	2.0	44.8	< 5	211.8	< 5	597.7	< 5
CHAD	4.3	13.6	< 5	69.8	< 5	307.1	< 5
COMOROS	0.3	0.1	< 5	0.5	< 5	1.0	< 5
CONGO	1.4	40.4	< 5	162.4	< 5	405.4	< 5
EGYPT	36.9	61.6	100	61.6	100	61.7	100
EQ GUINEA	0.3	3.9	< 5	11.5	< 5	33.7	< 5
ETHIOPIA	28.8	17.0	5	68.5	< 5	308.7	< 5
GABON	0.5	41.8	< 5	126.8	< 5	280.5	< 5
GAMBIA	0.5	0.8	17	3.4	< 5	11.2	< 5
GHANA	10.0	20.3	< 5	88.5	< 5	243.7	< 5
GUIN BISSAU	0.5	2.3	< 5	9.0	< 5	29.3	< 5
GUINEA	4.4	15.0	< 5	54.0	< 5	174.6	< 5
IVORY COAST	6.7	48.0	< 5	164.7	< 5	372.6	< 5
KENYA	13.5	3.7	22	12.1	7	52.8	< 5
LESOTHO	1.2	0.6	< 5	1.4	< 5	3.1	< 5
LIBERIA	1.6	9.5	< 5	47.8	< 5	126.7	< 5
LIBYA	2.4	1.8	73	3.7	35	6.6	20
MADAGASCAR	7.7	48.3	11	192.1	< 5	559.3	< 5
MALAWI	5.2	6.7	< 5	24.3	< 5	57.1	< 5
MALI	5.8	7.8	9	35.1	< 5	171.0	< 5
MAURITANIA	1.4	0.5	9	2.0	< 5	8.4	< 5
MAURITIUS	0.9	0.6	63	1.2	35	0.9	45
MOROCCO	17.3	12.6	70	26.9	33	46.6	19
MOZAMBIQUE	9.2	38.2	< 5	156.7	< 5	535.0	< 5
NAMIBIA	0.9	0.7	< 5	2.1	< 5	32.0	< 5
NIGER	4.6	0.8	9	2.6	< 5	43.3	< 5
NIGERIA	65.7	54.1	< 5	218.2	< 5	740.1	< 5
REUNION	0.5	0.1	< 5	0.5	< 5	1.6	< 5
RWANDA	4.1	0.7	< 5	3.6	< 5	8.2	< 5
SAO TOME ETC	0.1	0.2	< 5	0.6	< 5	0.8	< 5
SENEGAL	5.0	4.4	19	19.4	< 5	104.5	< 5
SIERRA LEONE	3.0	5.1	< 5	27.8	< 5	50.0	< 5
SOMALIA	3.2	1.3	43	2.4	23	6.9	8
SUDAN	16.0	59.4	15	238.7	< 5	1036.4	< 5
SWAZILAND	0.5	0.8	< 5	3.6	< 5	6.5	< 5
TANZANIA	15.4	35.2	< 5	144.3	< 5	501.0	< 5
TOGO	2.3	3.9	< 5	18.4	< 5	52.2	< 5
TUNISIA	5.6	2.5	58	6.3	23	12.0	12
UGANDA	11.3	11.0	< 5	44.0	< 5	154.1	< 5
UPPER VOLTA	6.1	5.5	< 5	26.5	< 5	136.6	< 5
WESTN SAHARA	0.1	0.	< 5	0.	< 5	0.	< 5
ZAIRE	24.5	291.9	< 5	1281.0	< 5	2887.7	< 5
ZAMBIA	4.8	48.9	< 5	215.9	< 5	766.6	< 5
ZIMBABWE	6.2	10.3	12	48.7	< 5	186.7	< 5
AFRICA	380.2	1121.9	9	4391.0	< 5	12872.5	< 5

AFRICA (YEAR 2000)

		LOW INPUTS		INTERMEDIATE INPUTS		HIGH INPUTS	
LOCATION	YEAR 2000 PROJ.POP. (mill.)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)
ALGERIA	36.0	12.0	61	28.5	26	49.4	15
ANGOLA	11.8	53.1	< 5	276.7	< 5	929.3	< 5
BENIN	6.5	6.2	< 5	27.9	< 5	100.5	< 5
BOTSWANA	1.4	0.9	< 5	4.8	< 5	46.2	< 5
BURUNDI	7.8	0.8	< 5	4.3	< 5	9.7	< 5
CAMEROON	13.0	76.5	< 5	208.2	< 5	609.6	< 5
CAPE VERDE	0.4	0.0	< 5	0.0	< 5	0.0	< 5
CENT AFR	3.6	44.8	< 5	212.1	< 5	596.9	< 5
CHAD	8.0	14.2	5	70.1	< 5	306.4	< 5
COMOROS	0.4	0.1	< 5	0.5	< 5	1.0	< 5
CONGO	2.5	40.6	< 5	162.3	< 5	404.8	< 5
EGYPT	64.7	112.6	100	112.6	100	112.6	100
EQ GUINEA	0.6	3.9	< 5	11.5	< 5	33.6	< 5
ETHIOPIA	55.3	20.1	22	70.8	6	307.0	< 5
GABON	0.8	41.8	< 5	126.8	< 5	280.4	< 5
GAMBIA	1.0	1.2	50	3.7	17	11.2	5
GHANA	21.2	21.9	11	88.9	< 5	238.8	< 5
GUIN BISSAU	0.8	2.3	< 5	9.0	< 5	29.2	< 5
GUINEA	8.2	15.0	< 5	53.7	< 5	173.8	< 5
IVORY COAST	13.9	47.6	< 5	162.4	< 5	367.9	< 5
KENYA	33.6	5.8	53	13.6	23	51.7	6
LESOTHO	2.1	0.5	< 5	1.4	< 5	3.1	< 5
LIBERIA	3.5	9.6	< 5	47.2	< 5	125.2	< 5
LIBYA	5.8	6.9	94	8.5	76	10.9	59
MADAGASCAR	15.1	55.5	24	196.0	7	559.7	< 5
MALAWI	11.9	7.3	18	24.0	5	55.1	< 5
MALI	11.6	10.5	34	37.3	10	171.3	< 5
MAURITANIA	2.9	1.3	68	2.8	32	9.0	10
MAURITIUS	1.3	0.6	66	1.1	36	1.0	39
MOROCCO	36.1	28.3	87	41.5	60	59.6	42
MOZAMBIQUE	18.2	39.4	6	157.0	< 5	532.8	< 5
NAMIBIA	1.7	0.7	< 5	2.1	< 5	31.9	< 5
NIGER	9.7	1.4	49	3.1	21	43.4	< 5
NIGERIA	148.9	54.4	9	206.5	< 5	700.7	< 5
REUNION	0.7	0.1	< 5	0.5	< 5	1.5	< 5
RWANDA	9.0	0.7	7	3.4	< 5	7.7	< 5
SAO TOME ETC	0.1	0.2	< 5	0.6	< 5	0.8	< 5
SENEGAL	9.7	7.6	54	22.3	18	105.8	< 5
SIERRA LEONE	6.1	5.4	8	27.3	< 5	49.2	< 5
SOMALIA	6.3	2.1	66	3.2	43	7.7	18
SUDAN	31.3	80.6	38	259.4	12	1054.7	< 5
SWAZILAND	0.9	0.8	< 5	3.5	< 5	6.4	< 5
TANZANIA	33.8	37.9	12	145.5	< 5	497.5	< 5
TOGO	5.0	4.1	8	18.3	< 5	51.0	< 5
TUNISIA	9.6	6.7	85	10.2	56	15.5	37
UGANDA	24.6	11.2	< 5	42.9	< 5	149.6	< 5
UPPER VOLTA	11.8	6.0	11	26.7	< 5	135.2	< 5
WESTN SAHARA	0.2	0.	< 5	0.	< 5	0.	< 5
ZAIRE	46.2	290.6	< 5	1282.2	< 5	2874.2	< 5
ZAMBIA	10.4	48.7	< 5	214.7	< 5	762.9	< 5
ZIMBABWE	14.0	13.3	32	50.9	8	184.8	< 5
AFRICA	780.1	1253.7	20	4488.6	5	12868.1	< 5

TABLE 2.4 contd.

SOUTHWEST ASIA (YEAR 1975)

LOCATION	YEAR 1975[1] POP. (mill.)	LOW INPUTS POTENTIAL POP. (mill.)	LOW INPUTS IRRIGATION CONTRIBUTION (percent)	INTERMEDIATE INPUTS POTENTIAL POP. (mill.)	INTERMEDIATE INPUTS IRRIGATION CONTRIBUTION (percent)	HIGH INPUTS POTENTIAL POP. (mill.)	HIGH INPUTS IRRIGATION CONTRIBUTION (percent)
AFGHANISTAN	19.3	12.0	82	15.0	65	20.5	48
BAHRAIN	0.3	0.0	< 5	0.0	< 5	0.0	< 5
IRAN	32.7	28.4	84	38.2	62	54.1	44
IRAQ	11.0	9.0	80	20.1	36	34.9	21
ISRAEL	3.5	1.3	86	2.1	54	3.1	37
JORDAN	2.7	0.6	75	1.1	43	1.4	34
KUWAIT	1.0	0.0	< 5	0.0	< 5	0.0	< 5
LEBANON	2.8	0.7	81	1.2	48	1.4	42
QATAR	0.2	0.0	< 5	0.0	< 5	0.0	< 5
SAUDI ARABIA	7.2	1.5	89	1.9	73	4.7	29
SYRIA	7.4	5.3	71	11.8	32	19.6	19
OMAN	0.8	0.0	< 5	0.0	< 5	0.0	< 5
TURKEY	40.1	44.8	79	76.6	46	118.4	30
U A EMIRATES	0.6	0.1	100	0.1	100	0.1	100
YEMEN AR	5.3	2.5	86	3.7	59	7.7	28
YEMEN DEM	1.7	1.0	87	1.2	69	1.9	43
SOUTHWEST ASIA	136.3	107.3	80	173.0	49	267.7	32

SOUTHWEST ASIA (YEAR 2000)

LOCATION	YEAR 2000[1] PROJ.POP. (mill.)	LOW INPUTS POTENTIAL POP. (mill.)	LOW INPUTS IRRIGATION CONTRIBUTION (percent)	INTERMEDIATE INPUTS POTENTIAL POP. (mill.)	INTERMEDIATE INPUTS IRRIGATION CONTRIBUTION (percent)	HIGH INPUTS POTENTIAL POP. (mill.)	HIGH INPUTS IRRIGATION CONTRIBUTION (percent)
AFGHANISTAN	36.7	15.9	86	18.8	73	24.3	57
BAHRAIN	0.5	0.0	< 5	0.0	< 5	0.0	< 5
IRAN	65.4	41.3	88	51.0	71	66.8	55
IRAQ	24.3	9.2	81	18.5	40	29.8	25
ISRAEL	5.6	1.8	92	2.3	70	2.8	57
JORDAN	5.9	0.9	84	1.3	58	1.6	48
KUWAIT	3.2	0.0	< 5	0.0	< 5	0.0	< 5
LEBANON	4.9	1.1	90	1.5	67	1.6	61
QATAR	0.4	0.0	< 5	0.0	< 5	0.0	< 5
SAUDI ARABIA	15.6	2.7	94	3.0	83	5.8	43
SYRIA	16.3	10.0	86	15.6	55	21.7	40
OMAN	1.7	0.0	< 5	0.0	< 5	0.0	< 5
TURKEY	69.4	92.7	91	121.4	69	159.3	53
U A EMIRATES	1.6	0.1	100	0.1	100	0.1	100
YEMEN AR	10.0	3.5	88	4.7	65	9.0	34
YEMEN DEM	3.4	1.0	87	1.3	70	2.0	44
SOUTHWEST ASIA	264.8	180.1	89	239.6	66	324.8	49

CENTRAL AMERICA (YEAR 1975)

	LOW INPUTS			INTERMEDIATE INPUTS		HIGH INPUTS	
LOCATION	YEAR 1975[1] POP. (mill.)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)
ANTIGUA	0.1	0.0	< 5	0.1	< 5	0.2	< 5
BAHAMAS	0.2	0.3	< 5	3.2	< 5	12.0	< 5
BARBADOS	0.2	0.0	< 5	0.1	< 5	0.3	< 5
BELIZE	0.1	2.2	< 5	9.7	< 5	24.4	< 5
COSTA RICA	2.0	6.1	18	19.1	6	51.7	< 5
CUBA	9.3	11.2	55	19.5	32	80.1	8
DOMINICAN RP	5.2	6.0	50	13.6	22	27.7	11
EL SALVADOR	4.1	2.0	46	5.0	19	15.8	6
GUADELOUPE	0.3	0.1	< 5	1.0	< 5	1.7	< 5
GUATEMALA	6.2	8.0	18	22.9	6	76.6	< 5
HAITI	5.2	2.6	33	6.4	13	11.5	7
HONDURAS	3.1	9.2	9	22.7	< 5	74.0	< 5
JAMAICA	2.0	1.6	44	4.3	16	9.3	7
MARTINIQUE	0.3	0.1	< 5	0.3	< 5	0.9	< 5
MEXICO	59.2	100.6	49	244.6	20	633.6	8
NETH ANTILLE	0.2	0.0	< 5	0.0	< 5	0.0	< 5
NICARAGUA	2.3	14.8	6	42.6	< 5	119.3	< 5
PANAMA	1.7	8.7	< 5	30.0	< 5	74.6	< 5
PUERTO RICO	3.1	1.2	75	3.0	30	6.2	14
TRINIDAD ETC	1.1	0.5	52	2.6	10	4.4	6
WINDWARD IS.	0.4	0.2	< 5	0.8	< 5	2.3	< 5
CENTRAL AMERICA	106.6	175.5	38	451.5	14	1226.6	5

CENTRAL AMERICA (YEAR 2000)

	LOW INPUTS			INTERMEDIATE INPUTS		HIGH INPUTS	
LOCATION	YEAR 2000[1] PROJ.POP. (mill.)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill.)	IRRIGATION CONTRIBUTION (percent)
ANTIGUA	0.1	0.0	< 5	0.1	< 5	0.2	< 5
BAHAMAS	0.3	0.3	< 5	3.2	< 5	11.9	< 5
BARBADOS	0.3	0.0	< 5	0.1	< 5	0.3	< 5
BELIZE	0.2	2.2	< 5	9.7	< 5	24.3	< 5
COSTA RICA	3.4	7.9	39	20.5	15	51.6	6
CUBA	12.7	28.3	84	35.2	67	84.9	28
DOMINICAN RP	9.3	8.9	69	15.9	39	28.9	21
EL SALVADOR	8.7	3.1	70	5.6	39	14.8	15
GUADELOUPE	0.4	0.1	< 5	1.0	< 5	1.6	< 5
GUATEMALA	12.7	11.7	46	25.8	21	77.2	7
HAITI	9.9	4.0	62	7.3	34	11.4	22
HONDURAS	7.0	10.4	21	23.7	9	73.9	< 5
JAMAICA	2.9	2.2	63	4.6	29	9.2	15
MARTINIQUE	0.4	0.1	< 5	0.3	< 5	0.9	< 5
MEXICO	132.3	183.3	73	321.5	42	696.2	19
NETH ANTILLE	0.4	0.0	< 5	0.0	< 5	0.0	< 5
NICARAGUA	5.2	17.1	19	44.3	7	118.4	< 5
PANAMA	2.8	9.2	11	30.3	< 5	74.3	< 5
PUERTO RICO	4.4	2.6	90	4.1	56	6.7	35
TRINIDAD ETC	1.4	0.8	70	2.7	20	4.4	12
WINDWARD IS.	0.4	0.2	< 5	0.8	< 5	2.2	< 5
CENTRAL AMERICA	215.2	292.3	64	556.7	33	1293.4	14

TABLE 2.4 contd.

SOUTH AMERICA (YEAR 1975)

		LOW INPUTS		INTERMEDIATE INPUTS		HIGH INPUTS	
LOCATION	YEAR 1975[1] POP. (mill)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)
ARGENTINA	25.4	151.8	12	437.9	< 5	924.1	< 5
BOLIVIA	4.9	77.9	< 5	309.0	< 5	726.6	< 5
BRAZIL	109.7	624.1	< 5	2961.5	< 5	7142.2	< 5
CHILE	10.2	13.1	72	26.3	36	44.8	21
COLOMBIA	23.8	130.0	< 5	399.1	< 5	898.3	< 5
ECUADOR	6.9	26.2	14	104.0	< 5	176.2	< 5
FR GUIANA	0.1	24.7	< 5	89.1	< 5	97.9	< 5
GUYANA	0.8	26.9	6	107.3	< 5	257.9	< 5
PARAGUAY	2.6	34.4	< 5	128.4	< 5	309.7	< 5
PERU	15.5	79.4	13	194.4	5	606.6	< 5
SURINAM	0.4	27.1	< 5	129.4	< 5	290.1	< 5
URUGUAY	2.8	18.5	< 5	56.3	< 5	133.8	< 5
VENEZUELA	12.7	79.5	5	244.2	< 5	741.3	< 5
SOUTH AMERICA	215.8	1313.7	6	5187.0	< 5	12349.3	< 5

SOUTH AMERICA (YEAR 2000)

		LOW INPUTS		INTERMEDIATE INPUTS		HIGH INPUTS	
LOCATION	YEAR 2000[1] PROJ.POP. (mill)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)
ARGENTINA	32.9	169.2	21	450.9	8	937.8	< 5
BOLIVIA	9.3	80.0	< 5	310.6	< 5	727.2	< 5
BRAZIL	212.5	648.8	8	2995.4	< 5	7119.1	< 5
CHILE	14.9	26.2	86	39.1	58	57.1	40
COLOMBIA	42.5	142.4	13	410.6	5	902.0	< 5
ECUADOR	14.6	35.2	37	111.9	12	182.3	7
FR GUIANA	0.1	24.7	< 5	89.1	< 5	97.8	< 5
GUYANA	1.3	27.9	10	107.0	< 5	257.5	< 5
PARAGUAY	5.3	35.2	< 5	128.0	< 5	307.5	< 5
PERU	29.5	91.8	25	207.0	11	617.5	< 5
SURINAM	0.7	27.7	< 5	129.0	< 5	290.1	< 5
URUGUAY	3.4	18.8	5	56.5	< 5	133.7	< 5
VENEZUELA	25.7	89.6	16	253.3	6	745.6	< 5
SOUTH AMERICA	392.6	1417.6	13	5288.3	< 5	12375.3	< 5

TABLE 2.4 contd.

SOUTHEAST ASIA (YEAR 1975)

LOCATION		LOW INPUTS		INTERMEDIATE INPUTS		HIGH INPUTS	
	YEAR 1975[1] POP. (mill)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)
BANGLADESH	76.6	35.4	29	100.6	10	160.8	6
BHUTAN	1.2	1.6	< 5	4.4	< 5	8.0	< 5
BRUNEI	0.2	0.5	< 5	4.7	< 5	5.6	< 5
BURMA	31.2	56.9	12	180.6	< 5	360.2	< 5
SRI LANKA	13.6	11.3	38	33.0	13	48.3	9
INDIA	618.7	499.7	56	1130.2	25	2191.0	13
INDONESIA	135.9	285.6	21	985.2	6	1440.7	< 5
KAMPUCHEA DM	8.1	19.4	< 5	75.8	< 5	156.8	< 5
LAO	3.3	8.4	< 5	27.9	< 5	73.5	< 5
MALAYSIA	11.9	87.4	6	257.2	< 5	236.1	< 5
NEPAL	12.7	12.0	14	33.7	5	51.7	< 5
PAKISTAN	70.3	80.1	95	87.2	88	95.9	82
PHILIPPINES	43.8	47.5	27	166.4	8	267.4	5
SINGAPORE	2.3	0.0	< 5	0.0	< 5	0.0	< 5
THAILAND	41.4	59.5	39	165.4	14	366.6	6
VIETNAM	46.5	42.1	34	124.4	12	227.9	6
SOUTHEAST ASIA	1117.7	1247.5	39	3376.7	14	5690.6	8

SOUTHEAST ASIA (YEAR 2000)

LOCATION		LOW INPUTS		INTERMEDIATE INPUTS		HIGH INPUTS	
	YEAR 2000[1] PROJ.POP. (mill)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)	POTENTIAL POP. (mill)	IRRIGATION CONTRIBUTION (percent)
BANGLADESH	153.3	120.7	91	149.5	73	185.2	59
BHUTAN	2.0	1.5	< 5	4.4	< 5	8.0	< 5
BRUNEI	0.3	0.5	< 5	4.6	< 5	5.6	< 5
BURMA	55.1	65.7	26	184.6	9	355.2	5
SRI LANKA	20.1	15.5	62	34.2	28	47.2	20
INDIA	1036.6	1298.1	87	1800.1	63	2619.9	43
INDONESIA	221.5	349.9	38	1026.7	13	1470.6	9
KAMPUCHEA DM	13.4	20.4	10	75.8	< 5	155.2	< 5
LAO	5.7	9.1	10	28.1	< 5	73.3	< 5
MALAYSIA	20.2	91.8	13	260.0	5	237.4	< 5
NEPAL	22.4	23.5	65	39.7	39	55.1	28
PAKISTAN	145.0	230.3	99	236.1	97	243.4	95
PHILIPPINES	83.4	72.6	58	178.8	23	262.3	16
SINGAPORE	3.1	0.0	< 5	0.0	< 5	0.0	< 5
THAILAND	76.1	105.0	69	201.5	36	384.0	19
VIETNAM	79.4	59.1	58	134.1	25	231.5	15
SOUTHEAST ASIA	1937.7	2463.6	73	4358.3	41	6333.7	28

1/ U.N. data for 1975, millions of persons. U.N. 1979 ..

Table 3.1 PRESENT AND PROJECTED POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES OF FIVE REGIONS IN THE DEVELOPING WORLD

(density - person per hectare)

LOCATION	TOTAL LAND AREA (mill. ha) 1/	YEAR 1975 POP. (mill.) 2/	YEAR 1975 POP. DENSITY	POTENTIAL POPULATION SUPPORTING CAPACITY			YEAR 2000 POP. (mill.) 3/	YEAR 2000 POP. DENSITY	POTENTIAL POPULATION SUPPORTING CAPACITY		
				LOW INPUTS	INTER. INPUTS	HIGH INPUTS			LOW INPUTS	INTER. INPUTS	HIGH INPUTS
TOTAL	6 494.9	1 956.6	0.30	0.61	2.11	5.05	3 589.7	0.55	0.86	2.30	5.11
AFRICA	2 878.1	380.2	0.13	0.39	1.53	4.47	780.1	0.27	0.44	1.56	4.47
SOUTHWEST ASIA	677.4	136.3	0.20	0.16*	0.25	0.40	264.7	0.39	0.27*	0.35*	0.48
SOUTH AMERICA	1 770.2	215.8	0.12	0.72	2.92	6.97	392.6	0.22	0.78	2.96	6.99
CENTRAL AMERICA	271.6	106.6	0.39	0.64	1.65	4.51	215.2	0.79	1.07	2.04	4.76
SOUTHEAST ASIA	897.6	1 117.7	1.25	1.39	3.76	6.34	1 937.1	2.16	2.74	4.86	7.06

1/ Land areas derived from FAO/Unesco Soil Map, and exclude areas mapped as water bodies.

2/ UN data for 1975, millions of person. UN 1979.

3/ Projected UN data for 2000, millions of person. Medium variant. UN 1979.

* ASTERISK INDICATES POTENTIAL POPULATION SUPPORTING CAPACITY LESS THAN PRESENT AND/OR PROJECTED POPULATION

Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

TABLE 3.2 PRESENT POPULATIONS AND POTENTIAL POPULATION SUPPORTING CAPACITIES BY MAJOR CLIMATE AND LENGTH OF GROWING PERIOD (LGP) ZONE
(density - person per hectare)

--- AFRICA ---

LGP ZONE (days)	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	POTENTIAL POPULATION SUPPORTING CAPACITY		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS
MAJOR CLIMATE 1 WARM TROPICS						
365+ N	19.8	1.6	0.08	1.43	6.58	8.98
365- N	127.6	13.3	0.10	1.79	5.32	13.29
330-364 N	75.0	14.4	0.19	1.41	5.62	11.56
300-329 N	73.3	19.6	0.27	1.46	6.04	14.11
270-299 N	127.4	28.6	0.22	0.91	4.48	10.38
240-269 N	133.3	25.0	0.19	0.89	4.20	11.25
210-239 N	129.8	23.0	0.18	0.64	2.77	10.17
180-209 N	225.4	34.0	0.15	0.47	2.11	8.16
150-179 N	174.7	27.8	0.16	0.47	2.22	8.86
120-149 N	114.0	24.4	0.21	0.15*	0.90	5.48
90-119 N	71.8	12.2	0.17	0.10*	0.33	3.45
75-89 N	58.2	8.2	0.14	0.06*	0.17	1.68
1-74 N	369.2	24.2	0.07	0.03*	0.04*	0.06*
0 Dry	180.6	4.4	0.02	0.00*	0.00*	0.00*
1-74 I	64.8	1.4	0.02	0.01*	0.01*	0.03
75-89 I	22.7	1.3	0.06	0.03*	0.10	0.97
90-119 I	49.6	3.2	0.06	0.03*	0.16	1.99
120-149 I	<0.1	<0.1	0.19	0.11*	0.51	2.36
150-179 I	-	-	-	-	-	-
180-209 I		-	-	-	-	-
SUB-TOTAL	2017.3	266.6	0.13	0.51	2.08	6.16
MAJOR CLIMATE 2 MODERATELY COOL TROPICS						
365+ N	-	-	-	-	-	-
365- N	1.4	0.4	0.30	0.01*	0.07*	0.87
330-364 N	1.6	0.8	0.50	0.05*	0.25*	1.90
300-329 N	2.1	0.8	0.39	0.13*	0.63	2.95
270-299 N	7.3	2.6	0.36	0.17*	0.84	4.13
240-269 N	10.6	5.3	0.51	0.27*	1.36	4.77
210-239 N	9.6	3.8	0.40	0.27*	1.41	5.03
180-209 N	8.8	2.6	0.29	0.23*	1.26	4.57
150-179 N	4.2	1.9	0.46	0.23*	0.90	3.53
120-149 N	3.9	1.3	0.33	0.14*	0.60	2.30
90-119 N	4.7	0.9	0.20	0.02*	0.05*	0.10*
75-89 N	2.6	0.7	0.28	0.02*	0.05*	0.12*
1-74 N	1.5	0.3	0.17	0.05*	0.06*	0.08*
0 DRY	2.7	0.0	0.00	0.04	0.04	0.04
1-74 I	2.5	<0.1	0.01	0.01*	0.02	0.02
75-89 I	0.1	<0.1	0.01	<0.01*	0.01	0.03
90-119 I	0.1	0.0	0.00	<0.01	0.01	0.03
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
SUB-TOTAL	63.6	21.5	0.34	0.17*	0.84	3.21
MAJOR CLIMATE 3 COOL TROPICS						
365+ N	-	-	-	-	-	-
365- N	0.7	0.2	0.31	0.01*	0.05*	0.29*
330-364 N	0.7	0.4	0.52	0.04*	0.16*	0.54
300-329 N	1.0	0.4	0.41	0.04*	0.19*	0.59
270-299 N	3.5	1.2	0.35	0.06*	0.26*	0.78
240-269 N	5.1	2.2	0.44	0.12*	0.81	3.09
210-239 N	4.6	2.3	0.51	0.18*	0.91	3.07
180-209 N	4.2	1.3	0.30	0.27*	1.23	4.29
150-179 N	2.0	1.0	0.49	0.21*	0.85	3.32
120-149 N	1.8	0.6	0.36	0.11*	0.52	2.20
90-119 N	2.0	0.5	0.23	0.02*	0.06*	0.10*
75-89 N	1.2	0.4	0.31	0.02*	0.05*	0.12*
1-74 N	0.7	0.1	0.18	0.01*	0.02*	0.04*
0 Dry	1.4	0.0	0.00	0.00	0.00	0.00
1-74 I	1.2	<0.1	0.01	0.01	0.02	0.02
75-89 I	0.1	0.0	0.00	<0.01	0.01	0.03
90-119 I	<0.1	0.0	0.00	<0.01	0.01	0.02
SUB-TOTAL	30.3	10.7	0.35	0.12*	0.58	2.08
MAJOR CLIMATE 4 COLD TROPICS						
0 COLD	2.9	1.2	0.41	0.05*	0.10*	0.20*
MAJOR CLIMATE 5 MODERATELY COOL/COOL SUB-TROPICS						
365+&- N	-	-	-	-	-	-
300-364 N	-	-	-	-	-	-
240-299 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 6 TRANSITIONAL MODERATELY COOL SUB-TROPICS						
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)						
300-329 N	-	-	-	-	-	-
270-299 N	<0.1	<0.1	0.21	0.37	4.62	5.60
240-269 N	<0.1	<0.1	0.54	0.48*	2.46	5.32
210-239 N	<0.1	<0.1	0.50	0.54	2.94	5.25
180-209 N	0.6	0.2	0.28	0.70	3.19	4.65
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	227.6	1.3	0.01	<0.01*	<0.01*	<0.01*
1-74 I	8.8	0.1	0.01	0.01*	0.01*	0.02
75-89 I	0.7	0.1	0.08	0.05*	0.23	1.19
90-119 I	1.5	0.1	0.08	0.14	0.45	2.05
120-149 I	0.3	0.1	0.19	0.65	2.18	4.77
150-179 I	0.3	0.1	0.42	0.53	1.70	3.28
180-209 I	-	-	-	-	-	-
SUB-TOTAL	239.8	1.9	0.01	<0.01*	0.02	0.04
MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	<0.1	<0.1	0.16	0.34	0.79	2.04
210-239 N	<0.1	<0.1	0.16	0.37	1.00	2.14
180-209 N	0.4	0.1	0.36	0.30*	1.10	2.64
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	4.0	<0.1	<0.01	<0.01*	<0.01*	<0.01*
1-74 I	0.7	0.1	0.11	0.01*	0.02*	0.02*
75-89 I	0.1	<0.1	0.56	0.01*	0.01*	0.02*
90-119 I	0.2	0.1	0.50	0.14*	0.26*	0.23*
120-149 I	0.3	0.1	0.48	0.16*	0.29*	0.59
150-179 I	0.7	0.3	0.41	0.29*	0.56	1.27
SUB-TOTAL	6.3	0.8	0.12	0.06*	0.15	0.34
MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	<0.1	<0.1	0.40	0.01*	0.03*	0.15*
210-239 N	<0.1	<0.1	0.20	0.02*	0.05*	0.14*
180-209 N	0.2	0.1	0.35	0.36	0.99	2.65
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	2.0	<0.1	<0.01	<0.01*	<0.01*	<0.01*
1-74 I	0.3	<0.1	0.14	0.01*	0.02*	0.02*
75-89 I	<0.1	<0.1	0.68	0.01*	0.01*	0.02*
90-119 I	0.1	<0.1	0.54	0.10*	0.26*	0.22*
120-149 I	0.1	0.1	0.52	0.08*	0.21*	0.52
150-179 I	0.3	0.1	0.42	0.19*	0.51	1.24
180-209 I	-	-	-	-	-	-
SUB-TOTAL	3.1	0.4	0.13	0.05*	0.13	0.32
MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)						
0 COLD	0.2	<0.1	0.20	0.05*	0.10*	0.20*
MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)						
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	0.1	<0.1	0.42	0.19*	0.76	2.83
210-239 N	7.6	6.7	0.89	0.31*	1.37	3.06
180-209 N	7.2	8.4	1.17	0.43*	2.00	4.06
150-179 N	5.5	4.3	0.78	0.70*	2.08	3.72
120-149 N	5.7	4.3	0.76	0.42*	1.35	2.57
90-119 N	7.5	3.8	0.51	0.43*	0.87	1.40
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	428.4	33.5	0.08	0.14	0.14	0.14
1-74 I	38.3	6.9	0.18	0.14*	0.16*	0.19
75-89 I	7.1	5.4	0.77	0.55*	0.58*	0.63*
90-119 I	1.5	0.9	0.59	0.66	1.10	1.76
SUB-TOTAL	508.7	74.2	0.15	0.17	0.24	0.34
MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)						
0 COLD	6.0	2.9	0.49	0.05*	0.10*	0.20*
MAJOR CLIMATE 13 COOL TEMPERATE						
150-179 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 14 COLD TEMPERATE						
0 COLD	-	-	-	-	-	-
AFRICA TOTALS	2878.1	380.2	0.13	0.39	1.53	4.47

1/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.
2/ U.N. data for 1975, millions of persons. U.N. 1979a
* ASTERISK INDICATES POTENTIAL LESS THAN PRESENT POPULATION
N - Normal growing period I - Intermediate growing period
Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

TABLE 3.2 contd

--- SOUTHWEST ASIA ---

LGP ZONE (days)	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	POTENTIAL POPULATION SUPPORTING CAPACITY		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS
MAJOR CLIMATE 1	**WARM TROPICS**					
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	108.3	5.5	0.05	0.01•	0.01•	0.01•
1-74 I	15.4	1.3	0.09	0.07•	0.08•	0.09•
75-89 I	6.1	1.5	0.24	0.08•	0.16•	0.74
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	129.8	8.3	0.06	0.02•	0.03•	0.06•
MAJOR CLIMATE 2	**MODERATELY COOL TROPICS**					
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
120-149 N	2.9	0.8	0.26	0.17•	0.37	1.16
90-119 N	4.4	1.1	0.24	0.08•	0.13•	0.40
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	1.1	0.2	0.16	<0.01•	<0.01•	<0.01•
1-74 I	0.9	0.1	0.15	0.04•	0.05•	0.06•
75-89 I	1.8	0.2	0.13	0.02•	0.02•	0.05•
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
SUB-TOTAL	11.0	2.4	0.21	0.08•	0.15•	0.47
MAJOR CLIMATE 3	**COOL TROPICS**					
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
80-209 N	-	-	-	-	-	-
50-179 N	-	-	-	-	-	-
20-149 N	1.4	0.5	0.37	0.09•	0.20•	0.39
90-119 N	2.2	0.9	0.41	0.06•	0.13•	0.20•
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	0.5	0.1	0.16	<0.01•	<0.01•	<0.01•
1-74 I	0.4	<0.1	0.09	0.01•	0.01•	0.02•
75-89 I	0.9	0.1	0.11	<0.01•	0.01•	0.02•
90-119 I	-	-	-	-	-	-
SUB-TOTAL	5.4	1.6	0.30	0.05•	0.11•	0.19•
MAJOR CLIMATE 4	**COLD TROPICS**					
0 COLD	-	-	-	-	-	-
MAJOR CLIMATE 5	**MODERATELY COOL/COOL SUB-TROPICS**					
65+&- N	-	-	-	-	-	-
00-364 N	-	-	-	-	-	-
40-299 N	-	-	-	-	-	-
10-239 N	-	-	-	-	-	-
80-209 N	-	-	-	-	-	-
50-179 N	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
AJOR CLIMATE 6	**TRANSITIONAL MODERATELY COOL SUB-TROPICS**					
30-364 N	-	-	-	-	-	-
00-329 N	-	-	-	-	-	-
70-299 N	-	-	-	-	-	-
40-269 N	-	-	-	-	-	-
10-239 N	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
20-149 I	-	-	-	-	-	-
50-179 I	-	-	-	-	-	-
80-209 I	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-

LGP ZONE (days)	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	POTENTIAL POPULATION SUPPORTING CAPACITY		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS
MAJOR CLIMATE 7	**WARM SUB-TROPICS (SUMMER RAINFALL)**					
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	-	-	-	-	-	-
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 8	**MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)**					
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	-	-	-	-	-	-
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 9	**COOL SUB-TROPICS (SUMMER RAINFALL)**					
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	-	-	-	-	-	-
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 10	**COLD SUB-TROPICS (SUMMER RAINFALL)**					
0 COLD	-	-	-	-	-	-
MAJOR CLIMATE 11	**COOL SUB-TROPICS (WINTER RAINFALL)**					
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	0.3	0.4	1.46	4.29	4.38	4.57
300-329 N	0.3	0.3	1.00	2.23	2.33	2.77
270-299 N	1.7	1.1	0.63	0.83	1.16	2.06
240-269 N	2.7	2.1	0.78	1.33	1.87	3.05
210-239 N	6.9	6.3	0.93	0.32•	1.01	1.97
180-209 N	10.6	11.2	1.05	0.28•	1.18	2.26
150-179 N	13.9	8.6	0.62	0.74	1.76	2.91
120-149 N	17.2	7.2	0.42	0.43	1.05	1.94
90-119 N	35.4	15.2	0.43	0.59	0.94	1.49
75-89 N	3.1	1.4	0.46	0.12•	0.39•	0.63
1-74 N	23.8	6.3	0.27	0.28	0.30	0.37
0 Dry	259.9	14.4	0.06	0.05•	0.05•	0.05•
1-74 I	32.1	8.2	0.26	0.31	0.33	0.33
75-89 I	5.8	2.9	0.51	0.31•	0.34•	0.37•
90-119 I	-	-	-	-	-	-
SUB-TOTAL	413.7	85.9	0.21	0.20•	0.34	0.52
MAJOR CLIMATE 12	**COLD SUB-TROPICS (WINTER RAINFALL)**					
0 COLD	100.2	32.4	0.32	0.09•	0.14•	0.24•
MAJOR CLIMATE 13	**COOL TEMPERATE**					
150-179 N	1.6	0.7	0.45	2.13	2.75	2:61
90-119 N	0.7	0.3	0.44	8.73	8.94	9.42
75-89 N	1.4	0.7	0.52	0.44•	0.61	0.77
1-74 N	-	-	-	-	-	-
SUB-TOTAL	3.8	1.8	0.48	2.80	3.17	3.26
MAJOR CLIMATE 14	**COLD TEMPERATE**					
0 COLD	13.5	3.9	0.29	0.05•	0.10•	0.20•
SOUTHWEST ASIA REGION TOTALS	677.4	136.3	0.20	0.16	0.25	0.40

/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.
/ U.N. data for 1975, millions of persons. U.N. 1979
ASTERISK INDICATES POTENTIAL LESS THAN PRESENT POPULATION
- Normal growing period I - Intermediate growing period
riginal data to three decimal places. Apparent discrepancies
n some totals due to rounding off.

TABLE 3.2 contd.

--- SOUTH AMERICA ---

LGP ZONE (days)	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	POTENTIAL POPULATION SUPPORTING CAPACITY		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS
MAJOR CLIMATE 1 WARM TROPICS						
365+ N	110.4	2.2	0.02	1.02	2.91	8.31
365- N	150.9	7.6	0.05	1.39	4.08	9.85
330-364 N	76.3	8.1	0.11	1.16	4.11	9.93
300-329 N	269.0	11.8	0.04	0.79	5.00	9.21
270-299 N	173.0	18.5	0.11	0.63	3.48	9.25
240-269 N	126.8	16.0	0.13	0.71	3.74	10.07
210-239 N	63.1	7.0	0.11	0.71	3.12	10.35
180-209 N	24.2	2.9	0.12	0.55	2.39	7.88
150-179 N	31.1	8.8	0.28	0.53	2.12	6.29
120-149 N	30.1	8.8	0.29	0.17*	1.02	3.55
90-119 N	3.0	2.2	0.71	1.13	1.50	4.21
75-89 N	5.2	2.8	0.53	0.48*	0.66	2.21
1-74 N	14.4	5.0	0.35	0.20*	0.21*	0.22*
0 Dry	3.6	1.1	0.31	0.67	0.67	0.67
1-74 I	2.8	0.4	0.15	0.05*	0.05*	0.06*
75-89 I	24.4	4.4	0.18	0.21	0.33	0.73
90-119 I	20.6	3.0	0.15	0.24	0.44	1.69
120-149 I	6.1	0.1	0.01	0.10	0.43	1.95
150-179 I	6.4	0.2	0.02	0.27	0.94	2.80
180-209 I	7.8	0.1	0.01	0.42	1.23	3.54
SUB-TOTAL	1149.2	110.8	0.10	0.81	3.54	8.53
MAJOR CLIMATE 2 MODERATELY COOL TROPICS						
365+ N	-	-	-	-	-	-
365- N	7.2	1.2	0.17	0.01*	0.07*	0.87
330-364 N	14.3	4.4	0.31	0.02*	0.08*	0.85
300-329 N	3.8	0.3	0.07	0.03*	0.07*	0.95
270-299 N	4.5	0.3	0.07	0.07	0.10	0.79
240-269 N	2.9	0.9	0.32	0.10*	0.48	2.70
210-239 N	0.5	0.1	0.26	0.01*	0.05*	0.56
180-209 N	1.0	0.2	0.15	<0.01*	0.03*	0.47
150-179 N	2.2	1.9	0.85	0.32*	0.93	2.76
120-149 N	3.7	0.7	0.19	0.15*	0.60	2.01
90-119 N	1.5	0.6	0.37	0.25*	0.41	1.02
75-89 N	1.3	0.4	0.32	0.02*	0.14*	0.41
1-74 N	1.1	0.3	0.31	<0.01*	0.01*	0.02*
0 Dry	8.4	3.2	0.38	<0.01*	<0.01*	<0.01*
1-74 I	-	-	-	-	-	-
75-89 I	0.8	0.1	0.07	<0.01*	<0.01*	0.01*
90-!19 I	2.7	0.1	0.05	0.31	0.33	0.36
120-149 I	0.2	0.1	0.42	1.09	1.32	2.80
150-179 I	0.1	0.1	1.22	0.96*	1.12*	2.78
SUB-TOTAL	56.2	14.9	0.27	0.07*	0.18*	0.92
MAJOR CLIMATE 3 COOL TROPICS						
365+ N	-	-	-	-	-	-
365- N	0.3	0.2	0.59	<0.01*	<0.01*	0.15*
330-364 N	5.1	1.5	0.30	0.01*	0.04*	0.58
300-329 N	1.0	0.2	0.23	0.06*	0.20*	1.24
270-299 N	0.6	0.1	0.11	0.12	0.45	1.59
240-269 N	1.0	0.2	0.15	0.14*	0.73	1.94
210-239 N	0.3	<0.1	0.15	0.44	1.40	3.87
180-209 N	0.7	0.1	0.13	0.67	2.09	7.09
150-179 N	3.4	0.6	0.16	0.54	1.31	3.89
120-149 N	2.7	0.5	0.18	0.23	0.89	2.74
90-119 N	4.4	0.7	0.15	0.17	0.58	1.31
75-89 N	0.1	0.1	0.39	0.01*	0.15*	0.39
1-74 N	<0.1	<0.1	0.36	<0.01*	0.01*	0.01*
0 Dry	4.7	0.3	0.06	<0.01*	<0.01*	<0.01*
1-74 I	2.4	0.2	0.07	0.01*	0.01*	0.02*
75-89 I	2.3	0.2	0.07	<0.01*	<0.01*	0.01*
90-119 I	1.6	0.2	0.10	0.02*	0.06*	0.30
SUB-TOTAL	30.7	4.8	0.16	0.14*	0.42	1.31
MAJOR CLIMATE 4 COLD TROPICS						
0 COLD	31.3	5.9	0.19	0.05*	0.10*	0.20
MAJOR CLIMATE 5 MODERATELY COOL/COOL SUB-TROPICS						
365+&- N	63.6	14.6	0.23	1.54	6.61	17.92
300-364 N	38.9	15.3	0.39	1.99	6.28	13.81
240-299 N	24.8	6.7	0.27	1.43	4.28	9.00
210-239 N	0.8	0.1	0.18	0.88	3.06	7.65
180-209 N	0.3	<0.1	0.05	0.83	1.45	6.14
150-179 N	-	-	-	-	-	-
SUB-TOTAL	128.4	36.8	0.29	1.65	6.02	14.86
MAJOR CLIMATE 6 TRANSITIONAL MODERATELY COOL SUB-TROPICS						
330-364 N	3.1	0.5	0.15	0.45	1.58	6.19
300-329 N	23.2	3.7	0.16	1.09	3.16	7.77
270-299 N	5.5	2.2	0.39	1.91	5.53	12.35
240-269 N	6.9	1.3	0.19	1.49	7.34	15.33
210-239 N	6.4	1.9	0.30	1.06	3.33	9.66
75-89 I	2.6	<0.1	0.02	0.41	0.42	0.62
90-119 I	3.7	<0.1	0.01	0.12	0.19	0.70
120-149 I	1.2	<0.1	0.02	0.37	1.25	2.43
150-179 I	1.9	0.1	0.05	0.55	1.58	2.46
180-209 I	7.3	0.7	0.10	0.97	3.16	5.80
SUB-TOTAL	61.7	10.4	0.17	1.04	3.40	7.92
MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)						
300-329 N	-	-	-	-	-	-
270-299 N	0.6	<0.1	<0.01	1.20	7.56	14.24
240-269 N	0.2	0.2	0.83	1.36	7.55	20.90
210-239 N	4.0	0.3	0.06	2.40	7.27	14.41
180-209 N	3.1	0.4	0.13	1.74	2.27	8.24
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	6.7	0.2	0.03	0.09	0.09	0.09
1-74 I	8.9	0.4	0.04	0.55	0.55	0.56
75-89 I	3.2	0.1	0.05	0.11	0.28	1.81
90-119 I	10.6	0.4	0.03	0.49	1.11	2.31
120-149 I	10.0	0.5	0.04	0.57	1.61	3.44
150-179 I	9.7	0.7	0.07	0.58	1.64	3.43
180-209 I	13.6	1.3	0.09	0.88	3.00	5.42
SUB-TOTAL	70.6	4.4	0.06	0.71	1.89	3.87
MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	5.4	2.0	0.37	0.22*	1.07	2.50
365- N	2.7	0.9	0.33	0.23*	1.50	3.36
330-364 N	0.4	0.1	0.30	0.21*	0.91	1.95
300-329 N	0.6	0.1	0.21	0.47	1.46	3.08
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	10.5	0.3	0.03	0.01*	0.01*	0.01*
1-74 I	12.7	0.7	0.05	0.23	0.23	0.25
75-89 I	0.8	<0.1	0.06	0.06	0.16	2.13
90-119 I	0.7	0.1	0.08	0.43	2.25	7.09
120-149 I	0.8	0.1	0.13	0.67	1.94	4.78
150-179 I	0.5	0.1	0.12	0.06*	0.14	0.24
SUB-TOTAL	35.1	4.4	0.13	0.18	0.50	1.11
MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	0.4	0.1	0.30	0.13*	0.50	1.02
365- N	-	-	-	-	-	-
270-299 N	3.1	1.4	0.44	0.15*	1.51	3.89
240-269 N	1.8	0.8	0.44	0.43*	1.63	3.63
210-239 N	2.4	1.1	0.45	1.02	2.21	4.01
180-209 N	<0.1	<0.1	0.06	<0.01*	<0.01*	<0.01*
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	5.9	0.2	0.04	0.18	0.18	0.18
1-74 I	2.4	0.1	0.04	0.01*	0.01*	0.01*
75-89 I	0.9	<0.1	0.03	0.19	0.24	0.65
90-119 I	8.3	1.2	0.14	0.18	0.42	1.55
120-149 I	1.0	0.3	0.28	0.32	0.62	1.21
150-179 I	1.0	0.4	0.40	0.11*	0.67	1.13
180-209 I	2.0	0.8	0.40	0.09*	0.97	1.36
SUB-TOTAL	36.1	9.5	0.26	0.23*	0.64	1.78
MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)						
0 COLD	17.1	0.6	0.04	0.05	0.10	0.20
MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)						
365+ N	3.5	0.4	0.11	0.07*	0.37	0.74
365- N	0.9	0.1	0.13	0.05*	0.23	0.49
330-364 N	1.1	0.1	0.11	0.02*	0.23	0.70
300-329 N	0.5	0.1	0.12	0.13	0.87	1.97
270-299 N	0.5	0.1	0.12	0.25	1.84	3.66
240-269 N	1.7	0.2	0.09	0.16	1.32	2.00
210-239 N	1.1	0.2	0.22	0.22*	0.87	2.30
180-209 N	1.2	0.5	0.43	0.45	1.70	3.77
150-179 N	0.9	0.4	0.48	0.64	1.54	2.95
120-149 N	0.8	0.7	0.86	0.36*	1.94	4.92
90-119 N	3.3	3.5	1.06	1.13	1.65	2.70
75-89 N	2.6	0.2	0.09	0.34	0.64	1.15
1-74 N	9.8	1.3	0.13	0.07*	0.08*	0.10*
0 Dry	34.6	2.8	0.08	0.32	0.32	0.32
1-74 I	13.7	0.2	0.02	0.03	0.04	0.07
75-89 I	0.5	<0.1	0.02	0.06	0.25	0.81
90-119 I	1.5	<0.1	0.02	0.06	0.42	0.77
SUB-TOTAL	78.3	11.0	0.14	0.25	0.41	0.65
MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)						
0 COLD	4.9	1.4	0.28	0.05*	0.10*	0.20*
MAJOR CLIMATE 13 COOL TEMPERATE						
150-179 N	-	-	-	-	-	-
90-119 N	1.2	<0.1	<0.01	<0.01*	<0.01*	<0.01*
75-89 N	8.9	0.1	0.01	0.02	0.11	0.25
1-74 N	46.4	0.7	0.01	0.04	0.05	0.08
SUB-TOTAL	63.1	0.8	0.01	0.04	0.06	0.10
MAJOR CLIMATE 14 COLD TEMPERATE						
0 COLD	7.5	0.1	0.01	0.05	0.10	0.20
SOUTH AMERICA REGION TOTALS	1770.2	215.8	0.12	0.72	2.92	6.97

1/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.

2/ U.N. data for 1975, millions of persons. U.N. 1979

* ASTERISK INDICATES POTENTIAL LESS THAN PRESENT POPULATION

N - Normal growing period I - Intermediate growing period

Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

TABLE 3.2 contd.

--- CENTRAL AMERICA ---

LGP ZONE (days)	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	POTENTIAL POPULATION SUPPORTING CAPACITY LOW INPUTS	INTER INPUTS	HIGH INPUTS
MAJOR CLIMATE 1 WARM TROPICS						
365+ N	-	-	-	-	-	-
365- N	1.2	0.1	0.10	1.70	5.15	17.09
330-364 N	9.5	3.9	0.41	1.40	4.86	13.20
300-329 N	10.9	4.3	0.40	1.73	4.93	10.75
270-299 N	15.2	6.0	0.39	0.96	3.18	8.58
240-269 N	8.3	3.3	0.40	1.03	3.46	10.36
210-239 N	15.2	8.0	0.53	1.00	3.29	9.00
180-209 N	16.1	7.8	0.48	0.99	3.01	8.93
150-179 N	16.4	10.8	0.66	0.90	2.18	8.71
120-149 N	6.1	4.5	0.75	0.52*	1.44	5.36
90-119 N	0.3	0.6	1.94	0.62*	1.26*	4.10
75-89 N	1.0	0.6	0.56	1.25	1.46	2.45
1-74 N	1.6	0.3	0.17	0.61	0.61	0.62
0 Dry	-	-	-	-	-	-
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	101.7	50.2	0.49	1.07	3.23	9.24
MAJOR CLIMATE 2 MODERATELY COOL TROPICS						
365+ N	-	-	-	-	-	-
365- N	0.8	0.4	0.59	0.05*	0.12*	0.98
330-364 N	0.8	0.3	0.40	0.06*	0.20*	1.16
300-329 N	0.5	0.4	0.82	0.16*	0.43*	2.07
270-299 N	3.2	1.1	0.34	0.17*	0.52	2.37
240-269 N	6.7	3.0	0.45	0.58	1.40	4.10
210-239 N	7.2	7.0	0.98	0.22*	0.73*	3.57
180-209 N	10.4	10.3	0.99	0.22*	0.93*	4.20
150-179 N	10.5	4.8	0.45	0.21*	0.72	2.77
120-149 N	10.2	3.9	0.38	0.11*	0.44	2.08
90-119 N	1.7	0.9	0.53	0.09*	0.17*	1.05
75-89 N	1.9	0.4	0.23	0.08*	0.11*	0.50
1-74 N	11.8	2.2	0.18	0.24	0.25	0.25
0 Dry	-	-	-	-	-	-
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
SUB-TOTAL	65.7	34.8	0.53	0.23*	0.64	2.48
MAJOR CLIMATE 3 COOL TROPICS						
365+ N	-	-	-	-	-	-
365- N	0.1	<0.1	0.07	0.05*	0.19	0.69
330-364 N	0.1	<0.1	0.25	0.01*	0.05*	0.36
300-329 N	0.1	<0.1	0.50	0.01*	0.04*	0.44*
270-299 N	-	-	-	-	-	-
240-269 N	0.1	<0.1	0.06	0.11	0.35	2.14
210-239 N	0.1	0.2	1.86	0.05*	0.32*	1.93
180-209 N	0.3	4.0	11.62	0.09*	0.27*	1.70*
150-179 N	0.1	<0.1	0.60	0.20*	0.58*	1.31
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	-	-	-	-	-	-
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
SUB-TOTAL	0.6	4.2	6.50	0.08*	0.28*	1.54*
MAJOR CLIMATE 4 COLD TROPICS						
0 COLD	0.7	4.2	5.92	0.05*	0.10*	0.20*
MAJOR CLIMATE 5 MODERATELY COOL/COOL SUB-TROPICS						
365+&- N	-	-	-	-	-	-
300-364 N	-	-	-	-	-	-
240-299 N	2.0	1.2	0.61	2.27	7.01	15.11
210-239 N	0.2	<0.1	0.20	1.86	4.29	9.28
180-209 N	0.1	<0.1	0.28	0.07*	0.05*	0.14*
150-179 N	0.1	<0.1	0.22	0.05*	0.02*	0.10*
SUB-TOTAL	2.4	1.3	0.54	2.06	6.21	13.39
MAJOR CLIMATE 6 TRANSITIONAL MODERATELY COOL SUB-TROPICS						
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)						
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	0.7	0.5	0.65	1.33	5.53	13.47
210-239 N	0.3	0.1	0.18	1.81	5.22	12.28
180-209 N	0.2	<0.1	0.26	2.04	5.42	12.07
150-179 N	2.5	0.5	0.22	1.48	4.60	9.03
120-149 N	0.6	0.2	0.33	0.62	2.26	4.94
90-119 N	0.2	0.1	0.50	0.57	1.35	3.18
75-89 N	0.2	0.1	0.64	0.13*	0.33*	1.68
1-74 N	48.3	5.9	0.12	0.31	0.32	0.32
0 Dry	32.2	2.3	0.07	0.67	0.67	0.67
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	85.2	9.7	0.11	0.50	0.66	0.93
MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
120-149 N	4.5	0.6	0.12	0.24	0.90	2.26
90-119 N	2.4	0.3	0.10	0.19	0.52	1.15
75-89 N	3.6	0.6	0.17	0.11*	0.28	0.71
1-74 N	-	-	-	-	-	-
0 Dry	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
SUB-TOTAL	10.5	1.4	0.14	0.18	0.60	1.47
MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	0.1	<0.1	<0.01	<0.01	<0.01	<0.01
MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)						
0 COLD	<0.1	<0.1	0.50	0.05*	0.10*	0.20*
MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)						
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	-	-	-	-	-	-
210-239 N	-	-	-	-	-	-
180-209 N	-	-	-	-	-	-
150-179 N	-	-	-	-	-	-
120-149 N	-	-	-	-	-	-
90-119 N	0.6	0.1	0.15	0.11*	0.32	1.07
75-89 N	0.2	<0.1	0.16	0.66	0.82	1.24
1-74 N	0.6	0.1	0.16	0.01*	0.02*	0.01*
0 Dry	3.5	0.5	0.14	0.56	0.56	0.56
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
SUB-TOTAL	4.9	0.7	0.15	0.44	0.48	0.59
MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)						
0 COLD	-	-	-	-	-	-
MAJOR CLIMATE 13 COOL TEMPERATE						
150-179 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 14 COLD TEMPERATE						
0 COLD	-	-	-	-	-	-
CENTRAL AMERICA REGION TOTALS	271.6	106.6	0.39	0.64	1.65	4.51

1/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.
2/ U.N. data for 1975, millions of persons. U.N. 1979
* ASTERISK INDICATES POTENTIAL LESS THAN PRESENT POPULATION
N - Normal growing period I - Intermediate growing period
Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

TABLE 3.2 contd.

--- SOUTHEAST ASIA ---

LGP ZONE (days)	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	POTENTIAL POPULATION SUPPORTING CAPACITY LOW INPUTS	INTER INPUTS	HIGH INPUTS
MAJOR CLIMATE 1 WARM TROPICS						
365+ N	83.0	14.8	0.18	1.25	6.11	4.87
365- N	68.0	37.8	0.56	2.02	5.48	10.20
330-364 N	22.6	27.9	1.23	2.02	7.09	9.58
300-329 N	46.8	55.6	1.19	1.77	5.69	10.14
270-299 N	54.3	94.8	1.75	1.34•	4.80	7.56
240-269 N	67.5	125.5	1.86	1.39•	4.15	7.65
210-239 N	63.9	96.6	1.51	1.29•	3.26	6.96
180-209 N	85.4	100.0	1.17	0.84•	2.49	6.22
150-179 N	59.9	90.0	1.50	1.37•	3.66	8.66
120-149 N	53.5	83.1	1.55	1.24•	3.38	7.23
90-119 N	31.4	50.1	1.59	1.91	2.84	4.00
75-89 N	9.2	12.9	1.41	2.05	2.37	3.01
1-74 N	15.6	10.3	0.66	1.93	1.94	1.95
0 Dry	5.2	4.4	0.85	0.41•	0.41•	0.41•
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
20-149 I	-	-	-	-	-	-
50-179 I	-	-	-	-	-	-
80-209 I	-	-	-	-	-	-
SUB-TOTAL	666.3	803.8	1.21	1.43	4.22	7.18
MAJOR CLIMATE 2 MODERATELY COOL TROPICS						
365+ N	2.3	0.8	0.36	0.14•	0.25•	0.35•
365- N	2.6	2.1	0.83	0.13•	0.36•	0.50•
30-364 N	1.0	2.2	2.11	0.11•	0.29•	0.41•
00-329 N	1.1	1.6	1.46	0.42•	1.06•	1.31•
70-299 N	1.0	0.9	0.92	0.57•	1.70	2.24
40-269 N	0.5	0.9	1.73	0.30•	0.77•	0.91•
10-239 N	0.4	0.3	0.68	0.18•	0.43•	0.30•
80-209 N	0.5	0.3	0.59	0.34•	1.52	2.77
50-179 N	0.1	0.2	2.49	0.13•	0.63•	1.18•
20-149 N	0.1	0.1	5.90	0.04•	0.10•	0.11•
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	-	-	-	-	-	-
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
20-149 I	-	-	-	-	-	-
50-179 I	-	-	-	-	-	-
SUB-TOTAL	9.4	9.3	0.99	0.23•	0.63•	0.86•
AJOR CLIMATE 3 COOL TROPICS						
365+ N	1.1	0.4	0.37	0.09•	0.13•	0.21•
365- N	1.2	1.0	0.83	0.07•	0.12•	0.18•
30-364 N	0.5	1.1	2.19	0.06•	0.09•	0.14•
00-329 N	0.5	0.7	1.34	0.09•	0.19•	0.29•
70-299 N	0.4	0.4	0.94	0.13•	0.38•	0.52•
40-269 N	0.2	0.4	2.00	0.11•	0.46•	0.56•
10-239 N	0.2	0.1	0.52	0.13•	0.24•	0.16•
80-209 N	0.2	0.1	0.66	0.37•	1.54	2.69
50-179 N	0.1	0.1	2.75	0.16•	0.87•	1.24•
20-149 N	0.1	0.1	6.20	0.03•	0.11•	0.12•
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
0 Dry	-	-	-	-	-	-
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
SUB-TOTAL	4.4	4.4	1.00	0.10•	0.25•	0.37•
AJOR CLIMATE 4 COLD TROPICS						
0 COLD	2.3	0.1	0.03	0.05	0.10	0.20
AJOR CLIMATE 5 MODERATELY COOL/COOL SUB-TROPICS						
65+&- N	-	-	-	-	-	-
00-364 N	-	-	-	-	-	-
40-299 N	-	-	-	-	-	-
10-239 N	-	-	-	-	-	-
80-209 N	-	-	-	-	-	-
50-179 N	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
AJOR CLIMATE 6 TRANSITIONAL MODERATELY COOL SUB-TROPICS						
30-364 N	-	-	-	-	-	-
00-329 N	-	-	-	-	-	-
70-299 N	-	-	-	-	-	-
40-269 N	-	-	-	-	-	-
10-239 N	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
20-149 I	-	-	-	-	-	-
50-179 I	-	-	-	-	-	-
80-209 I	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)						
300-329 N	8.4	11.4	1.36	1.93	7.09	14.86
270-299 N	4.4	5.9	1.34	1.24•	5.44	9.04
240-269 N	8.7	9.5	1.09	1.30	4.68	8.41
210-239 N	9.0	14.1	1.57	1.36•	4.12	7.53
180-209 N	7.9	32.5	4.12	2.54•	8.78	13.03
150-179 N	14.3	56.3	3.94	3.34•	6.66	12.11
120-149 N	16.4	53.0	3.23	1.91•	3.78	7.76
90-119 N	10.0	25.5	2.54	2.47•	3.35	4.06
75-89 N	3.8	11.9	3.15	0.77•	1.20•	1.83•
1-74 N	23.9	34.8	1.45	1.96	1.97	1.98
0 Dry	33.8	22.8	0.67	1.42	1.42	1.42
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	140.7	277.7	1.97	1.90•	3.71	6.06
MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	3.1	0.4	0.14	0.44	1.03	1.40
270-299 N	0.5	0.4	0.76	0.55•	1.26	1.49
240-269 N	1.0	0.4	0.42	0.36•	0.95	1.17
210-239 N	1.4	1.3	0.93	0.32•	0.70•	0.65•
180-209 N	0.8	1.2	1.48	0.46•	1.29•	1.70
150-179 N	0.8	1.1	1.30	0.41•	0.91•	1.28•
120-149 N	1.0	0.5	0.57	0.57	1.18	1.83
90-119 N	0.1	0.2	1.60	6.65	6.72	6.75
75-89 N	0.2	0.2	1.06	0.02•	0.07•	0.21•
1-74 N	0.1	0.1	2.00	<0.01•	0.01•	0.02•
0 Dry	0.1	<0.1	0.10	0.23	0.23	0.23
- -	-					
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
SUB-TOTAL	8.9	5.7	0.64	0.50•	1.05	1.35
MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
270-299 N	0.2	0.2	0.82	0.15•	0.30•	0.38•
240-269 N	0.5	0.2	0.44	0.16•	0.68	0.98
210-239 N	0.7	0.6	0.95	0.19•	0.40•	0.40•
180-209 N	0.4	0.6	1.48	0.45•	1.19•	1.59
150-179 N	0.4	0.5	1.42	0.36•	0.85•	1.09•
120-149 N	0.5	0.3	0.60	0.45•	1.14	1.72
90-119 N	0.1	0.1	1.22	8.30	8.37	8.39
75-89 N	0.1	0.1	1.00	0.02•	0.09•	0.21•
1-74 N	<0.1	<0.1	2.83	<0.01•	0.01•	0.01•
0 Dry	0.1	<0.1	0.10	0.13	0.13	0.13
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
120-149 I	-	-	-	-	-	-
150-179 I	-	-	-	-	-	-
180-209 I	-	-	-	-	-	-
SUB-TOTAL	4.3	2.7	0.64	0.31•	0.64•	0.83
MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)						
0 COLD	18.8	5.4	0.29	0.20•	0.25•	0.35
MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)						
365+ N	-	-	-	-	-	-
365- N	-	-	-	-	-	-
330-364 N	-	-	-	-	-	-
300-329 N	-	-	-	-	-	-
270-299 N	-	-	-	-	-	-
240-269 N	0.1	0.1	1.23	0.09•	0.28•	0.27•
210-239 N	0.2	0.2	1.01	0.25•	1.11	2.12
180-209 N	0.2	0.6	3.69	0.21•	0.85•	1.44•
150-179 N	0.1	0.4	3.46	0.07•	0.21•	0.25•
120-149 N	0.1	0.3	2.36	0.05•	0.18•	0.12•
90-119 N	<0.1	0.1	4.21	0.05•	0.19•	0.28•
75-89 N	-	-	-	-	-	-
1-74 N	15.2	0.9	0.06	0.36	0.36	0.37
0 Dry	-	-	-	-	-	-
1-74 I	-	-	-	-	-	-
75-89 I	-	-	-	-	-	-
90-119 I	-	-	-	-	-	-
SUB-TOTAL	15.9	2.7	0.17	0.35	0.37	0.40
MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)						
0 COLD	26.6	6.0	0.22	0.45	0.50	0.60
MAJOR CLIMATE 13 COOL TEMPERATE						
150-179 N	-	-	-	-	-	-
90-119 N	-	-	-	-	-	-
75-89 N	-	-	-	-	-	-
1-74 N	-	-	-	-	-	-
SUB-TOTAL	-	-	-	-	-	-
MAJOR CLIMATE 14 COLD TEMPERATE						
0 COLD	-	-	-	-	-	-
SOUTHEAST ASIA REGION TOTALS	897.6	1117.7	1.25	1.39	3.76	6.34

/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.
2/ U.N. data for 1975, millions of persons. U.N. 1979
ASTERISK INDICATES POTENTIAL LESS THAN PRESENT POPULATION
- Normal growing period   I - Intermediate growing period
Original data to three decimal places. Apparent discrepancies n some totals due to rounding off.

TABLE 3.2 contd.

--- FIVE DEVELOPING REGIONS ---

LGP ZONE (DAYS)	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	POTENTIAL POPULATION SUPPORTING CAPACITY		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS
MAJOR CLIMATE 1 WARM TROPICS						
365+ N	213.2	18.6	0.09	1.16	4.46	7.04
365- N	347.6	58.9	0.17	1.66	4.82	11.21
330-364 N	183.4	54.2	0.30	1.40	5.12	10.73
300-329 N	400.0	91.3	0.23	1.09	5.30	10.26
270-299 N	369.9	147.9	0.40	0.85	3.92	9.37
240-269 N	335.8	169.8	0.51	0.94	4.06	10.06
210-239 N	272.1	134.7	0.49	0.83	3.01	9.39
180-209 N	351.1	144.6	0.41	0.59	2.27	7.71
150-179 N	282.1	137.5	0.49	0.70	2.51	8.52
120-149 N	203.6	120.8	0.59	0.45*	1.59	5.65
90-119 N	106.6	65.1	0.61	0.67	1.11	3.64
75-89 N	73.7	24.5	0.33	0.36	0.50	1.89
1-74 N	400.8	39.7	0.10	0.12	0.13	0.14
0 Dry	297.7	15.4	0.05	0.02*	0.02*	0.02*
1-74 I	83.0	3.1	0.04	0.02*	0.03*	0.04
75-89 I	53.2	7.1	0.13	0.12*	0.21	0.83
90-119 I	70.2	6.2	0.09	0.09	0.26	1.90
120-149 I	6.1	0.1	0.01	0.10	0.44	1.96
150-179 I	6.4	0.2	0.03	0.27	0.94	2.80
180-209 I	7.8	0.1	0.01	0.43	1.25	3.54
SUB-TOTAL	4064.2	1239.7	0.31	0.75	2.81	6.88
MAJOR CLIMATE 2 MODERATELY COOL TROPICS						
365+ N	2.3	0.8	0.36	0.14*	0.25*	0.35*
365- N	12.0	4.2	0.35	0.04*	0.14*	0.80
330-364 N	17.6	7.7	0.44	0.03*	0.14*	0.93
300-329 N	7.6	3.1	0.41	0.13*	0.41*	1.64
270-299 N	15.9	4.9	0.31	0.17*	0.63	2.73
240-269 N	20.7	10.2	0.49	0.35*	1.24	4.17
210-239 N	17.7	11.2	0.64	0.24*	1.07	4.20
180-209 N	20.7	13.3	0.64	0.22*	1.04	4.14
150-179 N	17.0	8.7	0.51	0.23*	0.80	2.95
120-149 N	20.7	6.7	0.33	0.13*	0.49	1.98
90-119 N	12.3	3.5	0.28	0.08*	0.14*	0.45
75-89 N	5.7	1.6	0.27	0.04*	0.09*	0.31
1-74 N	14.4	2.8	0.19	0.20	0.21	0.22
0 Dry	12.2	3.4	0.28	0.01*	0.01*	0.01*
1-74 I	3.4	0.2	0.05	0.02*	0.03*	0.03*
75-89 I	2.7	0.3	0.11	0.01*	0.02*	0.03*
90-119 I	2.7	0.1	0.05	0.31	0.32	0.35
120-149 I	0.2	0.1	0.42	1.09	1.32	2.80
150-179 I	0.1	0.1	1.23	0.96*	1.13*	2.78
SUB-TOTAL	205.9	82.9	0.40	0.16*	0.55	2.10
MAJOR CLIMATE 3 COOL TROPICS						
365+ N	1.1	0.4	0.37	0.09*	0.13*	0.21*
365- N	2.2	1.4	0.62	0.05*	0.09*	0.22*
330-364 N	6.4	3.0	0.47	0.02*	0.06*	0.54
300-329 N	2.5	1.4	0.54	0.06*	0.21*	0.77
270-299 N	4.6	1.7	0.38	0.08*	0.30*	0.86
240-269 N	6.4	2.8	0.44	0.13*	0.79	2.81
210-239 N	5.2	2.6	0.51	0.19*	0.91	2.99
180-209 N	5.4	5.4	1.00	0.31*	1.33	4.40
150-179 N	5.5	1.6	0.30	0.42	1.26	3.65
120-149 N	5.9	1.7	0.29	0.16*	0.65	2.01
90-119 N	8.7	2.0	0.23	0.11*	0.34	0.74
75-89 N	1.3	0.4	0.32	0.02*	0.06*	0.15*
1-74 N	0.7	0.1	0.18	0.01*	0.02*	0.04*
0 Dry	6.6	0.3	0.05	<0.01*	<0.01*	<0.01*
1-74 I	4.1	0.2	0.06	0.01*	0.01*	0.02*
75-89 I	3.3	0.3	0.08	<0.01*	0.01*	0.01*
90-119 I	1.6	0.2	0.10	0.02*	0.06*	0.29
SUB-TOTAL	71.5	25.7	0.36	0.12*	0.47	1.49
MAJOR CLIMATE 4 COLD TROPICS						
0 COLD	37.3	11.4	0.31	0.05*	0.10*	0.20*
MAJOR CLIMATE 5 MODERATELY COOL/COOL SUB-TROPICS						
365+&- N	63.6	14.6	0.23	1.54	6.61	17.92
300-364 N	38.9	15.3	0.39	1.99	6.28	13.81
240-299 N	26.8	7.9	0.29	1.49	4.48	9.45
210-239 N	1.0	0.2	0.19	1.10	3.33	8.02
180-209 N	0.4	<0.1	0.10	0.65	1.12	4.76
150-179 N	0.1	<0.1	0.22	0.05*	0.02*	0.10*
SUB-TOTAL	130.8	38.1	0.29	1.66	6.03	14.83
MAJOR CLIMATE 6 TRANSITIONAL MODERATELY COOL SUB-TROPICS						
330-364 N	3.1	0.5	0.15	0.45	1.58	6.19
300-329 N	23.2	3.7	0.16	1.09	3.16	7.77
270-299 N	5.5	2.2	0.39	1.91	5.53	12.35
240-269 N	6.9	1.3	0.19	1.49	7.34	15.33
210-239 N	6.4	1.9	0.30	1.06	3.33	9.66
75-89 I	2.6	<0.1	0.02	0.41	0.42	0.62
90-119 I	3.7	<0.1	0.01	0.12	0.19	0.70
120-149 I	1.2	<0.1	0.02	0.37	1.25	2.43
150-179 I	1.9	0.1	0.05	0.55	1.58	2.46
180-209 I	7.3	0.7	0.10	0.97	3.16	5.80
SUB-TOTAL	61.7	10.4	0.17	1.04	3.40	7.92
MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)						
300-329 N	8.4	11.4	1.36	1.93	7.09	14.86
270-299 N	5.1	5.9	1.16	1.23	5.69	9.65
240-269 N	9.6	10.1	1.05	1.30	4.80	9.02
210-239 N	13.4	14.5	1.08	1.68	5.10	9.71
180-209 N	11.7	33.1	2.82	2.23*	7.43	11.34
150-179 N	16.8	56.9	3.39	3.07*	6.35	11.66
120-149 N	17.0	53.1	3.13	1.87*	3.73	7.67
90-119 N	10.2	25.5	2.50	2.43*	3.32	4.05
75-89 N	4.0	12.0	3.00	0.73*	1.16*	1.82*
1-74 N	72.3	40.7	0.56	0.86	0.86	0.87
0 Dry	300.4	26.6	0.09	0.23	0.23	0.23
1-74 I	17.7	0.5	0.03	0.28	0.28	0.29
75-89 I	3.8	0.2	0.05	0.10	0.27	1.70
90-119 I	12.0	0.5	0.04	0.45	1.04	2.28
120-149 I	10.3	0.5	0.05	0.58	1.62	3.48
150-179 I	10.0	0.8	0.08	0.58	1.65	3.42
180-209 I	13.6	1.3	0.09	0.88	3.00	5.42
SUB-TOTAL	536.3	293.7	0.55	0.67	1.35	2.26
MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	5.4	2.0	0.37	0.23*	1.09	2.50
365- N	2.7	0.9	0.33	0.26*	1.37	3.36
330-364 N	0.4	0.1	0.30	0.21*	0.90	1.95
300-329 N	3.7	0.6	0.15	0.45	1.11	1.68
270-299 N	0.5	0.4	0.76	0.55*	1.26	1.49
240-269 N	1.0	0.4	0.41	0.36*	0.94	1.19
210-239 N	1.4	1.3	0.91	0.32*	0.71*	0.68*
180-209 N	1.2	1.3	1.12	0.41*	1.23	2.00
150-179 N	0.8	1.1	1.30	0.41*	0.91*	1.28*
120-149 N	5.4	1.1	0.20	0.30	0.95	2.19
90-119 N	2.5	0.4	0.17	0.49	0.81	1.41
75-89 N	3.8	0.8	0.21	0.10*	0.25	0.69
1-74 N	<0.1	0.1	2.00	<0.01*	0.01*	0.02*
0 Dry	14.7	0.3	0.02	0.01*	0.01*	0.01*
1-74 I	13.4	0.8	0.06	0.22	0.22	0.24
75-89 I	0.9	0.1	0.11	0.06*	0.15	1.94
90-119 I	0.9	0.1	0.17	0.37	1.82	5.59
120-149 I	1.0	0.2	0.22	0.56	1.54	3.73
150-179 I	1.2	0.3	0.28	0.19*	0.38	0.82
SUB-TOTAL	60.8	12.3	0.20	0.22	0.56	1.13
MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)						
365+ N	0.4	0.1	0.30	0.15*	0.51	1.11
300-329 N	8.4	3.4	0.40	0.14*	0.33*	1.96
270-299 N	3.3	1.5	0.46	0.15*	1.46	3.67
240-269 N	2.2	1.0	0.44	0.41*	1.43	3.06
210-239 N	3.1	1.7	0.56	0.86	2.20	3.20
180-209 N	0.6	0.6	1.02	0.39*	1.04	1.78
150-179 N	0.4	0.5	1.42	0.36*	0.85*	1.09*
120-149 N	0.5	0.3	0.60	0.45*	1.14	1.72
90-119 N	0.1	0.1	1.22	8.30	8.37	8.39
75-89 N	0.1	0.1	1.00	0.02*	0.09*	0.21*
1-74 N	<0.1	<0.1	2.83	<0.01*	0.01*	0.01*
0 Dry	8.0	0.2	0.03	0.13	0.13	0.13
1-74 I	2.7	0.1	0.05	0.01*	0.01*	0.02*
75-89 I	0.9	<0.1	0.06	0.19	0.23	0.62
90-119 I	8.4	1.2	0.14	0.18	0.42	1.54
120-149 I	1.1	0.3	0.30	0.29*	0.58	1.13
150-179 I	1.3	0.5	0.41	0.29*	0.87	1.16
180-209 I	2.0	0.8	0.40	0.53	1.64	1.36
SUB-TOTAL	43.4	12.6	0.29	0.25*	0.68	1.58
MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)						
0 COLD	36.1	6.0	0.17	0.13*	0.18	0.28
MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)						
365+ N	3.5	0.4	0.11	0.07*	0.38	0.74
365- N	0.9	0.1	0.12	0.05*	0.26	0.49
330-364 N	1.3	0.5	0.38	0.88	1.07	1.47
300-329 N	0.8	0.4	0.45	0.93	1.41	2.27
270-299 N	2.2	1.1	0.51	0.69	1.39	2.43
240-269 N	4.6	2.4	0.52	0.84	1.68	2.58
210-239 N	15.7	13.5	0.86	0.31*	1.20	2.52
180-209 N	19.2	20.6	1.08	0.35*	1.54	3.02
150-179 N	20.4	13.8	0.68	0.72	1.83	3.12
120-149 N	23.9	12.6	0.53	0.42*	1.15	2.19
90-119 N	46.9	22.8	0.49	0.59	0.98	1.56
75-89 N	6.0	1.7	0.29	0.24*	0.52	0.88
1-74 N	49.3	8.5	0.20	0.26	0.28	0.32
0 Dry	726.5	51.3	0.07	0.12	0.12	0.12
1-74 I	84.1	15.4	0.18	0.19	0.21	0.22
75-89 I	13.4	8.4	0.63	0.42*	0.46*	0.53*
90-119 I	3.0	0.9	0.30	0.36	0.79	1.25
SUB-TOTAL	1021.6	174.4	0.17	0.19	0.30	0.44
MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)						
0 COLD	137.6	42.6	0.31	0.15*	0.20*	0.30*
MAJOR CLIMATE 13 COOL TEMPERATE						
150-179 N	1.6	0.7	0.46	2.16	2.75	2.61
90-119 N	2.0	0.3	0.17	3.29	3.38	3.54
75-89 N	10.3	0.8	0.08	0.07*	0.19	0.32
1-74 N	46.4	0.7	0.01	0.04	0.05	0.08
SUB-TOTAL	66.9	2.6	0.04	0.19	0.24	0.28
MAJOR CLIMATE 14 COLD TEMPERATE						
0 COLD	21.0	4.0	0.19	0.05*	0.10*	0.20
FIVE DEVELOPING REGIONS TOTALS	6494.9	1956.6	0.30	0.61	2.11	5.05

1/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.
2/ U.N. data for 1975, millions of persons. U.N. 1979
* ASTERISK INDICATES POTENTIAL LESS THAN PRESENT POPULATION
N - Normal growing period I - Intermediate growing period
Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

TABLE 3.3

EXTENTS AND POPULATIONS OF ALL CRITICAL INDIVIDUAL-COUNTRY LENGTH OF GROWING PERIOD (LGP) ZONE AREAS BY MAJOR CLIMATE AND LGP ZONE

--- AFRICA ---

LGP ZONE (days)	TOTAL[1] land area (1000 ha)	TOTAL[2] 1975 Pop. (1000)	TOTAL[3] No. of ctrys with zone	LOW INPUTS			INTERMEDIATE INPUTS			HIGH INPUTS			NUMBER[4] of affected countries L/I/H			MOST AFFECTED[5] COUNTRY	(LOW/INT./HIGH) Percentage of Total LGP Excess Populations
				Crit. area (1000 ha)	1975 Pop. (1000)	Excess Pop. (1000)	Crit. area (1000 ha)	1975 Pop. (1000)	Excess Pop. (1000)	Crit. area (1000 ha)	1975 Pop. (1000)	Excess Pop. (1000)					
MAJOR CLIMATE 1	WARM TROPICS																
365- N	127585	13348	11	66	205	90	66	205	44	-	-	-	1	1	-	TANZANIA	(100/100/ -)
330-364 N	75005	14369	19	206	793	319	60	84	84	206	793	168	2	1	2	COMOROS	(26/100/ 28)
300-329 N	73257	19602	19	40	194	21	-	-	-	-	-	-	1	-	-	MAURITIUS	(100/ -/ -)
270-299 N	127434	28587	22	9385	13412	1545	-	-	-	-	-	-	3	-	-	NIGERIA	(91/ -/ -)
240-269 N	133330	24995	27	14548	13544	1539	50	308	157	50	308	49	8	1	1	CHAD	(16/100/100)
210-239 N	129795	23031	28	1514	2445	1380	-	-	-	-	-	-	4	-	-	MALAWI	(40/ -/ -)
180-209 N	225443	33970	25	27370	12371	2156	36	17	4	-	-	-	5	1	-	RWANDA	(1/100/ -)
150-179 N	174718	27821	26	15621	9384	4903	1898	3083	520	-	-	-	5	3	-	GHANA	(37/ 85/ -)
120-149 N	113986	24382	22	56689	19843	12667	-	-	-	-	-	-	9	-	-	NIGERIA	(62/ -/ -)
90-119 N	71828	12212	17	45792	9309	5791	15264	5372	1348	-	-	-	9	4	-	NIGERIA	(33/ 45/ -)
75-89 N	58245	8233	14	56529	8059	4769	16245	3473	2144	-	-	-	11	3	-	NIGER	(32/ 55/ -)
1-74 N	369202	24178	13	289994	16033	13071	289994	16033	10435	214933	14471	6368	11	11	8	ETHIOPIA	(33/ 38/ 50)
0 Dry	180559	4378	13	180559	4378	4355	180559	4378	4355	180559	4378	4355	13	13	13	ETHIOPIA	(63/ 63/ 63)
1-74 I	64808	1358	6	41545	1220	948	6590	832	734	6590	832	648	5	3	3	ZIMBABWE	(34/ 41/ 42)
75-89 I	22697	1287	7	8420	982	648	2748	465	165	26	9	-	4	2	1	MOZAMBIQUE	(55/ 96/ -)
90-119 I	49589	3171	7	26680	2774	1924	12	821	821	12	821	821	5	1	1	MOZAMBIQUE	(43/100/100)
120-149 I	43	8	1	43	8	3	-	-	-	-	-	-	1	-	-	SWAZILAND	(100/ -/ -)
Sub-total	2017315	266558	46	775001	114960	56137	513522	35075	20816	402376	21614	12411	34	25	22		
MAJOR CLIMATE 2	MODERATELY COOL TROPICS																
365- N	1446	436	4	1446	436	415	1446	436	340	64	123	118	4	4	1	REUNION	(30/ 36/100)
330-364 N	1568	780	7	1568	780	706	871	705	511	179	470	301	7	6	3	RWANDA	(56/ 75/ 79)
300-329 N	2138	828	7	1500	753	548	435	525	441	234	419	118	6	3	2	RWANDA	(70/ 80/ 95)
270-299 N	7293	2639	11	2996	2481	2202	1881	2271	1663	632	1368	285	10	7	1	RWANDA	(60/ 71/100)
240-269 N	10570	5344	11	6924	4950	3498	1914	2263	562	69	137	39	7	4	1	UGANDA	(4/ 23/100)
210-239 N	9586	3798	12	6036	3307	1901	151	258	116	71	117	8	7	2	1	UGANDA	(6/ 92/100)
180-209 N	8775	2553	8	7843	2532	760	91	372	315	91	372	172	5	1	1	UGANDA	(47/100/100)
150-179 N	4216	1926	6	3311	1751	1053	938	971	356	-	-	-	3	2	-	UGANDA	(42/ 77/ -)
120-149 N	3876	1275	5	2852	1117	772	592	580	200	-	-	-	3	2	-	KENYA	(46/ 74/ -)
90-119 N	4707	942	5	4707	942	839	4707	942	706	2993	772	494	5	5	3	ETHIOPIA	(53/ 54/ 53)
75-89 N	2551	726	5	2523	726	672	2523	726	597	2523	726	433	4	4	4	ETHIOPIA	(85/ 86/ 90)
1-74 N	1462	252	5	1462	252	184	1462	252	164	1462	252	138	5	5	5	KENYA	(46/ 44/ 37)
1-74 I	2453	21	2	9	7	6	9	7	6	9	7	6	1	1	1	CAPE VERDE	(100/100/100)
75-89 I	131	1	1	131	1	-	-	-	-	-	-	-	1	-	-	NAMIBIA	(100/ -/ -)
Sub-total	63555	21528	20	43308	20043	13562	17020	10314	5983	8327	4768	2119	18	15	10		

TABLE 3.3 - continued

MAJOR CLIMATE 3 COOL TROPICS

365- N	697	218	4	697	218	212	697	218	182	120	118	92	4	4	3	REUNION	(28/ 32/ 62)
330-364 N	749	389	7	749	389	358	408	352	296	86	253	223	7	6	4	RWANDA	(55/ 65/ 79)
300-329 N	1010	417	7	1010	417	380	612	366	260	190	265	199	7	5	3	RWANDA	(52/ 73/ 85)
270-299 N	3534	1244	11	1402	1161	1085	1207	1111	951	811	1059	663	10	9	6	RWANDA	(55/ 61/ 76)
240-269 N	5084	2224	11	3365	2029	1685	612	444	210	32	65	30	7	5	1	UGANDA	(4/ 30/100)
210-239 N	4607	2329	12	2968	2088	1560	267	740	570	72	573	501	8	4	2	BURUNDI	(33/ 87/ 95)
180-209 N	4226	1255	8	3403	1066	348	34	183	170	34	183	126	5	1	1	UGANDA	(52/100/100)
150-179 N	1982	974	6	1561	884	589	410	496	258	-	-	-	3	2	-	UGANDA	(42/ 79/ -)
120-149 N	1804	644	5	1784	643	440	276	292	124	-	-	-	4	2	-	KENYA	(42/ 77/ -)
90-119 N	2043	468	5	2043	468	418	2043	468	356	2023	467	264	5	5	4	ETHIOPIA	(53/ 54/ 55)
75-89 N	1185	371	5	1169	371	345	1169	371	309	1169	371	234	3	3	3	ETHIOPIA	(82/ 82/ 83)
1-74 N	678	121	5	654	121	115	654	121	105	654	121	94	3	3	3	KENYA	(62/ 61/ 58)
1-74 I	1223	9	2	3	2	2	3	2	2	3	2	2	1	1	1	CAPE VERDE	(100/100/100)
Sub-total	30276	10672	20	20808	9866	7543	8392	5171	3797	5194	3482	2432	16	15	11		

MAJOR CLIMATE 4 COLD TROPICS

0 Cold	2905	1204	5	2882	1204	1060	2882	1204	916	2882	1204	628	4	4	4	ETHIOPIA	(61/ 56/ 38)
Sub-total	2905	1204	5	2882	1204	1060	2882	1204	916	2882	1204	628	4	4	4		

MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)

240-269 N	28	15	1	28	15	1	-	-	-	-	-	-	1	-	-	SWAZILAND	(100/ -/ -)
0 Dry	227602	1256	11	227602	1256	1218	227602	1256	1218	227602	1256	1218	11	11	11	EGYPT	(56/ 56/ 56)
1-74 I	8849	123	3	3012	89	69	3012	89	49	2454	80	9	2	2	1	BOTSWANA	(91/ 92/100)
75-89 I	684	53	1	684	53	17	-	-	-	-	-	-	1	-	-	BOTSWANA	(100/ -/ -)
90-119 I	1456	121	2	258	57	4	-	-	-	-	-	-	1	-	-	SWAZILAND	(100/ -/ -)
Sub-total	239832	1929	12	231584	1472	1311	230614	1346	1267	230056	1337	1228	12	11	11		

MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)

180-209 N	371	135	1	371	135	23	-	-	-	-	-	-	1	-	-	LESOTHO	(100/ -/ -)
0 Dry	3992	9	4	3948	9	9	3948	9	9	3948	9	9	3	3	3	ALGERIA	(67/ 67/ 67)
1-74 I	730	79	2	353	78	75	353	78	72	353	78	69	1	1	1	LESOTHO	(100/100/100)
75-89 I	80	45	1	80	45	44	80	45	44	80	45	43	1	1	1	LESOTHO	(100/100/100)
90-119 I	194	96	1	194	96	69	194	96	45	194	96	50	1	1	1	LESOTHO	(100/100/100)
120-149 I	261	126	1	261	126	83	261	126	50	-	-	-	1	1	-	LESOTHO	(100/100/ -)
150-179 I	654	265	1	654	265	73	-	-	-	-	-	-	1	-	-	LESOTHO	(100/ -/ -)
Sub-total	6332	764	5	5861	755	379	4836	354	221	4575	228	173	4	4	4		

TABLE 3.3 - continued

MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)

240-269 N	10	4	1	10	4	3	10	4	3	10	4	2	1	1	1	LESOTHO	(100/100/100)
210-239 N	10	2	1	10	2	1	10	2	1	10	2	-	1	1	1	LESOTHO	(100/100/100)
0 Dry	1984	3	4	1962	3	3	1962	3	3	1962	3	3	3	3	3	NAMIBIA	(33/ 33/ 33)
1-74 I	292	40	2	108	40	39	108	40	38	108	40	37	1	1	1	LESOTHO	(100/100/100)
75-89 I	34	23	1	34	23	22	34	23	22	34	23	22	1	1	1	LESOTHO	(100/100/100)
90-119 I	91	49	1	91	49	40	91	49	25	91	49	29	1	1	1	LESOTHO	(100/100/100)
120-149 I	126	65	1	126	65	54	126	65	38	-	-	-	1	1	-	LESOTHO	(100/100/ -)
150-179 I	324	137	1	324	137	75	-	-	-	-	-	-	1	-	-	LESOTHO	(100/ -/ -)
Sub-total	3056	388	5	2665	323	241	2341	186	133	2215	121	95	4	4	4		

MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)

0 Cold	185	52	1	185	52	42	185	52	33	185	52	15	1	1	1	LESOTHO	(100/100/100)
Sub-total	185	52	1	185	52	42	185	52	33	185	52	15	1	1	1		

MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)

240-269 N	84	34	1	84	34	18	-	-	-	-	-	-	1	-	-	ALGERIA	(100/ -/ -)
210-239 N	7587	6733	3	7587	6733	4386	-	-	-	-	-	-	3	-	-	ALGERIA	(48/ -/ -)
180-209 N	7163	8357	4	7053	8346	5302	3228	5695	338	-	-	-	3	2	-	MOROCCO	(70/ 60/ -)
150-179 N	5456	4263	4	2475	2312	1184	-	-	-	-	-	-	2	-	-	ALGERIA	(99/ -/ -)
120-149 N	5698	4331	4	2968	2713	2075	-	-	-	-	-	-	2	-	-	ALGERIA	(97/ -/ -)
90-119 N	7458	3803	4	4821	2511	1739	3141	1880	299	26	258	258	3	2	1	EGYPT	(15/ 86/100)
0 Dry	428445	33483	11	202404	1034	517	202404	1034	517	202404	1034	517	7	7	7	LIBYA	(54/ 54/ 54)
1-74 I	38269	6940	5	37059	4381	2970	32489	4258	2238	14985	3238	1592	4	3	2	MOROCCO	(55/ 62/ 68)
75-89 I	7060	5404	5	2011	4001	3707	2011	4001	3607	2011	4001	3312	3	3	3	EGYPT	(69/ 71/ 76)
Sub-total	508684	74215	11	266462	32069	21902	243273	16870	7002	219426	8531	5680	11	11	10		

MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)

0 Cold	5965	2930	2	5965	2930	2631	5965	2930	2333	5965	2930	1737	2	2	2	MOROCCO	(65/ 61/ 50)
Sub-total	5965	2930	2	5965	2930	2631	5965	2930	2333	5965	2930	1737	2	2	2		

AFRICA TOTALS:

	2878105	380244	51	1354721	183678	104813	1029030	73505	42506	881201	44270	26521	41	36	33		

TABLE 3.3 - continued

EXTENTS AND POPULATIONS OF ALL CRITICAL INDIVIDUAL-COUNTRY LENGTH OF GROWING PERIOD (LGP) ZONE AREAS BY MAJOR CLIMATE AND LGP ZONE

--- SOUTHWEST ASIA ---

LGP ZONE (days)	TOTAL land area (1000 ha)[1]	TOTAL 1975 Pop. (1000)[2]	TOTAL No. of ctrys with zone[3]	LOW INPUTS Crit. area (1000 ha)	LOW INPUTS 1975 Pop. (1000)	LOW INPUTS Excess Pop. (1000)	INTERMEDIATE INPUTS Crit. area (1000 ha)	INTERMEDIATE INPUTS 1975 Pop. (1000)	INTERMEDIATE INPUTS Excess Pop. (1000)	HIGH INPUTS Crit. area (1000 ha)	HIGH INPUTS 1975 Pop. (1000)	HIGH INPUTS Excess Pop. (1000)	NUMBER of affected countries[4] L	I	H	MOST AFFECTED COUNTRY (LOW/INT./HIGH) Percentage of Total LGP Excess Populations[5]
MAJOR CLIMATE 1		WARM TROPICS														
0 Dry	108278	5490	6	108278	5490	4088	108278	5490	4088	108278	5490	4088	6	6	6	SAUDI ARABIA(50/ 50/ 50)
1-74 I	15351	1328	5	12369	966	387	12369	966	301	12369	966	254	3	3	3	SAUDI ARABIA(60/ 74/ 82)
75-89 I	6129	1486	3	6129	1486	962	3069	1162	609	-	-	-	3	1	-	YEMEN DEM (83/100/ -)
Sub-total	129758	8304	6	126776	7942	5438	123716	7618	4999	120647	6456	4342	6	6	6	
MAJOR CLIMATE 2		MODERATELY COOL TROPICS														
120-149 N	2863	750	2	2863	750	249	514	81	28	-	-	-	2	1	-	SAUDI ARABIA(28/100/ -)
90-119 N	4398	1072	3	4398	1072	729	4012	1049	548	-	-	-	3	2	-	YEMEN DEM (70/ 73/ -)
0 Dry	1052	171	2	1052	171	171	1052	171	171	1052	171	171	2	2	2	SAUDI ARABIA(99/ 99/ 99)
1-74 I	908	135	3	814	122	102	814	122	96	814	122	93	2	2	2	SAUDI ARABIA(93/ 97/ 97)
75-89 I	1824	241	2	1824	241	212	1824	241	199	1824	241	155	2	2	2	SAUDI ARABIA(78/ 81/ 98)
Sub-total	11045	2369	3	10951	2356	1464	8216	1664	1044	3690	534	419	3	3	3	
MAJOR CLIMATE 3		COOL TROPICS														
120-149 N	1416	525	2	1416	525	400	1416	525	236	252	34	21	2	2	1	YEMEN DEM (92/ 88/ -)
90-119 N	2192	892	3	2192	892	755	2004	880	633	2004	880	500	3	2	2	YEMEN DEM (84/ 83/ 84)
0 Dry	507	79	2	503	79	79	503	79	79	503	79	79	1	1	1	SAUDI ARABIA(100/100/100)
1-74 I	430	37	3	430	37	34	430	37	31	430	37	29	3	3	3	SAUDI ARABIA(48/ 50/ 48)
75-89 I	895	102	2	895	102	98	895	102	92	895	102	81	2	2	2	SAUDI ARABIA(66/ 68/ 73)
Sub-total	5440	1635	3	5436	1635	1367	5248	1623	1072	4084	1132	711	3	3	3	

TABLE 3.3 - continued

MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)

330-364 N	263	385	2	20	52	50	20	52	48	20	52	39	1	1	1	TURKEY (100/100/100)
300-329 N	314	315	2	196	200	187	196	200	155	196	200	47	1	1	1	TURKEY (100/100/100)
270-299 N	1699	1071	2	1325	953	842	1325	953	456	-	-	-	1	1	-	TURKEY (100/100/ -)
240-269 N	2672	2086	2	1578	1438	1060	1578	1438	85	-	-	-	1	1	-	TURKEY (100/100/ -)
210-239 N	6851	6343	4	6851	6343	4178	88	200	13	-	-	-	4	1	-	LEBANON (2/100/ -)
180-209 N	10632	11193	7	9962	10930	8219	855	3245	2205	855	3245	1615	6	3	3	ISRAEL (20/ 58/ 49)
150-179 N	13874	8632	7	5239	4064	1974	817	2722	1278	480	1421	1147	4	3	2	LEBANON (47/ 69/ 75)
120-149 N	17226	7241	8	9117	3980	1983	484	434	159	-	-	-	5	1	-	JORDAN (18/100/ -)
90-119 N	35417	15218	8	14970	6192	2425	3536	1901	561	414	436	205	7	4	2	JORDAN (10/ 31/ 49)
75-89 N	3125	1442	3	3125	1442	1074	1621	1164	567	759	769	311	3	2	1	TURKEY (68/ 95/100)
1-74 N	23779	6317	2	10632	2717	627	10632	2717	417	-	-	-	1	1	-	IRAN (100/100/ -)
0 Dry	259937	14431	11	177540	7589	5927	177540	7589	5927	177540	7589	5927	8	8	8	SAUDI ARABIA(38/ 38/ 38)
1-74 I	32137	8246	6	1185	594	532	1185	594	518	1185	594	510	3	3	3	KUWAIT (67/ 68/ 68)
75-89 I	5815	2943	5	5815	2943	1162	4023	2144	991	4023	2144	865	5	4	4	IRAQ (43/ 47/ 51)
Sub-total	413741	85863	13	247555	49437	30246	203900	25353	13384	185472	16450	10669	13	13	11	

MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)

0 Cold	100165	32360	6	100165	32360	23792	100165	32360	18783	100165	32360	8767	6	6	6	AFGHANISTAN (44/ 47/ 63)
Sub-total	100165	32360	6	100165	32360	23792	100165	32360	18783	100165	32360	8767	6	6	6	

MAJOR CLIMATE 13 COOL TEMPERATE

90-119 N	734	326	2	150	82	63	150	82	42	150	82	18	1	1	1	IRAN (100/100/100)
75-89 N	1385	722	2	1385	722	108	169	104	49	169	104	90	2	1	1	TURKEY (84/100/100)
Sub-total	3756	1793	2	1535	804	171	319	186	91	319	186	108	2	2	2	

MAJOR CLIMATE 14 COLD TEMPERATE

0 Cold	13502	3949	2	13502	3949	3273	13502	3949	2598	13502	3949	1248	2	2	2	TURKEY (74/ 72/ 58)
Sub-total	13502	3949	2	13502	3949	3273	13502	3949	2598	13502	3949	1248	2	2	2	

SOUTHWEST ASIA TOTALS:

677407	136273	16	505920	98483	65755	455066	72753	41975	427879	61067	26268	16	16	16	

TABLE 3.3 - continued

EXTENTS AND POPULATIONS OF ALL CRITICAL INDIVIDUAL-COUNTRY LENGTH OF GROWING PERIOD (LGP) ZONE AREAS BY MAJOR CLIMATE AND LGP ZONE

--- SOUTH AMERICA ---

LGP ZONE (days)	TOTAL[1] land area (1000 ha)	TOTAL[2] 1975 Pop. (1000)	TOTAL[3] No. of ctrys with zone	LOW INPUTS Crit. area (1000 ha)	LOW INPUTS 1975 Pop. (1000)	LOW INPUTS Excess Pop. (1000)	INTERMEDIATE INPUTS Crit. area (1000 ha)	INTERMEDIATE INPUTS 1975 Pop. (1000)	INTERMEDIATE INPUTS Excess Pop. (1000)	HIGH INPUTS Crit. area (1000 ha)	HIGH INPUTS 1975 Pop. (1000)	HIGH INPUTS Excess Pop. (1000)	NUMBER[4] of affected countries L/I/H			MOST AFFECTED[5] COUNTRY (LOW/INT./HIGH) Percentage of Total LGP Excess Populations	
MAJOR CLIMATE 1	**WARM TROPICS**																
180-209 N	24199	2854	8	19	2	1	-	-	-	-	-	-	1	-	-	PERU	(100/ -/ -)
150-179 N	31128	8822	7	1806	2114	14	-	-	-	-	-	-	1	-	-	COLOMBIA	(100/ -/ -)
120-149 N	30094	8795	6	24425	8215	4333	1624	1355	202	-	-	-	3	1	-	VENEZUELA	(26/100/ -)
90-119 N	3036	2166	4	1434	1474	994	1434	1474	643	-	-	-	1	1	-	VENEZUELA	(100/100/ -)
75-89 N	5249	2769	4	3005	2325	1568	3005	2325	1034	-	-	-	2	2	-	VENEZUELA	(70/ 89/ -)
1-74 N	14360	5027	4	12202	4579	2232	12202	4579	2150	12202	4579	1933	2	2	2	COLOMBIA	(50/ 50/ 52)
1-74 I	2805	429	1	2805	429	287	2805	429	275	2805	429	264	1	1	1	BRAZIL	(100/100/100)
Sub-total	1149166	110840	11	45696	19138	9432	21070	10162	4306	15007	5008	2197	5	4	3		
MAJOR CLIMATE 2	**MODERATELY COOL TROPICS**																
365- N	7239	1243	5	6805	1241	1170	4890	1181	968	-	-	-	3	2	-	COLOMBIA	(92/ 93/ -)
330-364 N	14256	4422	4	14256	4422	4166	11343	4200	2993	-	-	-	4	2	-	COLOMBIA	(85/ 85/ -)
300-329 N	3822	282	5	3361	281	201	2201	201	118	-	-	-	4	3	-	ECUADOR	(70/ 65/ -)
270-299 N	4465	298	5	546	132	126	546	132	107	-	-	-	3	3	-	BRAZIL	(60/ 70/ -)
240-269 N	2923	930	5	2675	902	682	481	44	43	-	-	-	4	2	-	BRAZIL	(88/ -/ -)
210-239 N	527	138	4	527	138	134	483	118	117	42	67	50	4	3	1	VENEZUELA	(50/ 57/100)
180-209 N	1030	157	4	1030	157	152	967	132	131	35	17	3	4	3	1	BOLIVIA	(65/ 75/ -)
150-179 N	2201	1868	5	1826	1824	1189	872	1510	421	11	11	8	4	3	1	COLOMBIA	(90/ 96/ -)
120-149 N	3722	702	5	1966	322	233	800	109	70	25	14	9	4	2	1	VENEZUELA	(6/ 20/100)
90-119 N	1503	557	4	834	248	230	834	248	168	362	132	101	3	3	2	COLOMBIA	(52/ 71/ 90)
75-89 N	1270	404	3	1245	392	370	1270	404	261	25	12	10	2	3	1	ECUADOR	(51/ 54/ -)
1-74 N	1103	346	2	1128	358	354	1103	346	337	1103	346	326	3	2	2	PERU	(76/ 79/ 79)
0 Dry	8399	3222	1	8399	3222	3222	8399	3222	3222	8399	3222	3222	1	1	1	PERU	(100/100/100)
75-89 I	775	53	1	775	53	52	775	53	50	775	53	47	1	1	1	BOLIVIA	(100/100/100)
120-149 I	212	89	2	46	5	1	-	-	-	-	-	-	1	-	-	BOLIVIA	(100/ -/ -)
150-179 I	71	87	1	71	87	18	71	87	7	-	-	-	1	1	-	ECUADOR	(100/100/ -)
Sub-total	56202	14944	7	45490	13784	12306	35035	11987	9021	10777	3874	3781	6	6	5		

TABLE 3.3 - continued

MAJOR CLIMATE 3 COOL TROPICS

365- N	260	154	1	260	154	154	260	154	154	260	154	114	1	1	1	COLOMBIA (100/100/100)
330-364 N	5145	1539	3	5145	1539	1486	5145	1539	1306	-	-	-	3	3	-	COLOMBIA (88/ 87/ -)
300-329 N	959	224	3	959	224	166	348	131	125	-	-	-	3	2	-	ECUADOR (76/100/ -)
270-299 N	588	67	2	131	19	19	131	19	19	-	-	-	1	1	-	BOLIVIA (100/100/ -)
240-269 N	1003	153	4	686	105	63	154	56	55	-	-	-	3	2	-	ECUADOR (82/ 93/ -)
180-209 N	654	82	2	32	4	3	32	4	3	-	-	-	1	1	-	ECUADOR (100/100/ -)
120-149 N	2698	494	4	485	181	125	229	68	29	-	-	-	2	1	-	COLOMBIA (37/100/ -)
90-119 N	4446	665	2	69	19	15	-	-	-	-	-	-	1	-	-	ECUADOR (100/ -/ -)
75-89 N	146	57	1	146	57	55	146	57	34	-	-	-	1	1	-	PERU (100/100/ -)
1-74 N	14	5	1	14	5	4	14	5	4	14	5	4	1	1	1	PERU (100/100/100)
0 Dry	4728	269	2	4728	269	269	4728	269	269	4728	269	269	2	2	2	BOLIVIA (98/ 98/ 98)
1-74 I	2449	181	1	2449	181	159	2449	181	149	2449	181	125	1	1	1	BOLIVIA (100/100/100)
75-89 I	2295	161	2	2295	161	157	2295	161	153	2295	161	145	2	2	2	BOLIVIA (94/ 93/ 93)
90-119 I	1590	157	1	1590	157	126	1590	157	66	-	-	-	1	1	-	BOLIVIA (100/100/ -)
Sub-total	30721	4812	7	18989	3075	2807	17521	2801	2371	9746	770	658	7	7	5	

MAJOR CLIMATE 4 COLD TROPICS

0 Cold	31329	5937	6	30165	5898	4389	20992	5128	3028	4607	2211	1289	5	4	3	COLOMBIA (21/ 28/ 52)
Sub-total	31329	5937	6	30165	5898	4389	20992	5128	3028	4607	2211	1289	5	4	3	

MAJOR CLIMATE 5 MODERATELY COOL/COOL SUB-TROPICS

Sub-total	128447	36808	4	-	-	-	-	-	-	-	-	-	-	-	-	

MAJOR CLIMATE 6 TRANSITIONAL MODERATELY COOL SUB-TROPICS

270-299 N	5469	2150	2	412	1282	378	-	-	-	-	-	-	1	-	-	URUGUAY (100/ -/ -)
Sub-total	61668	10440	3	412	1282	378	-	-	-	-	-	-	1	-	-	

MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)

180-209 N	3073	411	2	102	5	1	-	-	-	-	-	-	1	-	-	BOLIVIA (100/ -/ -)
120-149 I	10033	451	3	30	2	2	30	2	2	30	2	2	1	1	1	BOLIVIA (100/100/100)
150-179 I	9705	681	3	408	21	20	408	21	15	-	-	-	1	1	-	BOLIVIA (100/100/ -)
Sub-total	70611	4368	3	540	28	24	438	23	17	30	2	2	1	1	1	

TABLE 3.3 - continued

MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)

365+ N	5419	2021	1	5419	2021	772	-	-	-	-	-	-	1	-	-	BRAZIL (100/ -/ -)
365- N	2658	880	1	2658	880	196	-	-	-	-	-	-	1	-	-	BRAZIL (100/ -/ -)
330-364 N	418	127	1	418	127	38	-	-	-	-	-	-	1	-	-	BRAZIL (100/ -/ -)
0 Dry	10549	284	1	10549	284	123	10549	284	123	10549	284	123	1	1	1	ARGENTINA (100/100/100)
150-179 I	507	63	1	507	63	31	-	-	-	-	-	-	1	-	-	ARGENTINA (100/ -/ -)
Sub-total	35116	4389	2	19551	3375	1162	10549	284	123	10549	284	123	2	1	1	

MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)

365+ N	387	116	1	387	116	56	-	-	-	-	-	-	1	-	-	BRAZIL (100/ -/ -)
300-329 N	6935	3172	1	6935	3172	2110	6935	3172	719	-	-	-	1	1	-	ARGENTINA (100/100/ -)
270-299 N	3130	1373	2	3130	1373	901	-	-	-	-	-	-	2	-	-	ARGENTINA (98/ -/ -)
180-209 N	48	3	1	48	3	3	48	3	3	48	3	3	1	1	1	ARGENTINA (100/100/100)
0 Dry	5903	233	2	48	5	1	48	5	1	48	5	1	1	1	1	CHILE (100/100/100)
1-74 I	2407	92	1	2407	92	75	2407	92	69	2407	92	57	1	1	1	ARGENTINA (100/100/100)
75-89 I	866	27	2	113	4	3	113	4	3	113	4	2	1	1	1	BOLIVIA (100/100/100)
90-119 I	8297	1158	2	21	1	-	21	1	-	21	1	-	1	1	1	BOLIVIA (100/100/100)
150-179 I	974	393	1	974	393	81	-	-	-	-	-	-	1	-	-	ARGENTINA (100/ -/ -)
Sub-total	36050	9467	5	14063	5159	3234	9572	3277	797	2637	105	65	5	3	3	

MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)

Sub-total	17097	608	3	-	-	-	-	-	-	-	-	-	-	-	-

MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)

365+ N	3484	376	1	3484	376	124	-	-	-	-	-	-	1	-	-	CHILE (100/ -/ -)
365- N	921	115	1	921	115	72	-	-	-	-	-	-	1	-	-	CHILE (100/ -/ -)
330-364 N	1056	113	1	1056	113	86	-	-	-	-	-	-	1	-	-	CHILE (100/ -/ -)
210-239 N	1072	237	1	1072	237	-	-	-	-	-	-	-	1	-	-	CHILE (100/ -/ -)
120-149 N	820	708	1	820	708	402	-	-	-	-	-	-	1	-	-	CHILE (100/ -/ -)
1-74 N	9751	1314	2	5856	1285	864	5856	1285	831	5856	1285	769	1	1	1	CHILE (100/100/100)
Sub-total	78289	10951	3	13209	2834	1550	5856	1285	831	5856	1285	769	1	1	1	

MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)

0 Cold	4892	1355	2	4892	1355	1110	2824	1213	930	2824	1213	648	2	1	1	CHILE (97/100/100)
Sub-total	4892	1355	2	4892	1355	1110	2824	1213	930	2824	1213	648	2	1	1	

TABLE 3.3 - continued

MAJOR CLIMATE 13 COOL TEMPERATE

90-119 N	1217	1	1	1217	2	2	1217	2	2	1217	2	2	1	1	1	ARGENTINA (100/100/100)
75-89 N	8884	71	2	4566	40	1	-	-	-	-	-	-	1	-	-	ARGENTINA (100/ -/ -)
1-74 N	46364	670	2	13755	391	327	13755	391	239	13755	391	86	1	1	1	CHILE (100/100/100)
Sub-total	63116	776	2	19538	433	330	14972	393	241	14972	393	88	2	2	2	

MAJOR CLIMATE 14 COLD TEMPERATE

Sub-total	7463	76	2	-	-	-	-	-	-	-	-	-	-	-	-

SOUTH AMERICA TOTALS:

	1770167	215774	13	212545	56362	36727	138829	36553	21670	77005	15145	9623	9	8	8

TABLE 3.3 - continued

EXTENTS AND POPULATIONS OF ALL CRITICAL INDIVIDUAL-COUNTRY LENGTH OF GROWING PERIOD (LGP) ZONE AREAS BY MAJOR CLIMATE AND LGP ZONE

--- CENTRAL AMERICA ---

LGP ZONE (days)	TOTAL land area (1000 ha) [1]	TOTAL 1975 Pop. (1000) [2]	TOTAL No. of ctrys with zone [3]	LOW INPUTS Crit. area (1000 ha)	LOW INPUTS 1975 Pop. (1000)	LOW INPUTS Excess Pop. (1000)	INTERMEDIATE INPUTS Crit. area (1000 ha)	INTERMEDIATE INPUTS 1975 Pop. (1000)	INTERMEDIATE INPUTS Excess Pop. (1000)	HIGH INPUTS Crit. area (1000 ha)	HIGH INPUTS 1975 Pop. (1000)	HIGH INPUTS Excess Pop. (1000)	NUMBER of affected countries L [4]	I	H	MOST AFFECTED COUNTRY (LOW/INT./HIGH) [5]	Percentage of Total LGP Excess Populations
MAJOR CLIMATE 1	**WARM TROPICS**																
330-364 N	9491	3871	8	1040	1915	783	-	-	-	-	-	-	2	-	-	HAITI	(93/ -/ -)
300-329 N	10851	4297	14	770	1785	968	74	391	132	-	-	-	5	2	-	BARBADOS	(23/ 89/ -)
270-299 N	15157	5987	9	948	2959	2447	592	2368	732	-	-	-	2	1	-	PUERTO RICO	(86/100/ -)
240-269 N	8260	3326	12	475	1053	636	157	491	122	157	491	84	4	1	1	TRINIDAD ETC	(37/100/100)
210-239 N	15228	8027	11	760	1520	682	-	-	-	-	-	-	2	-	-	HAITI	(67/ -/ -)
180-209 N	16117	7807	7	1694	2681	668	-	-	-	-	-	-	2	-	-	EL SALVADOR	(61/ -/ -)
150-179 N	16382	10819	6	1765	2923	1257	44	73	12	-	-	-	3	1	-	ANTIGUA	(4/100/ -)
120-149 N	6056	4543	5	5286	4176	1546	-	-	-	-	-	-	3	-	-	CUBA	(57/ -/ -)
90-119 N	314	609	3	214	579	485	214	579	329	-	-	-	2	2	-	JAMAICA	(98/ 99/ -)
75-89 N	998	563	3	338	196	166	338	196	92	-	-	-	1	1	-	HAITI	(100/100/ -)
1-74 N	1596	276	2	96	241	240	96	241	240	96	241	239	1	1	1	NETH ANTILLE	(100/100/100)
Sub-total	101650	50243	21	13386	20028	9884	1515	4339	1662	253	732	324	15	9	2		
MAJOR CLIMATE 2	**MODERATELY COOL TROPICS**																
365- N	751	440	3	751	440	402	476	423	337	60	160	118	3	2	1	HAITI	(39/ 45/100)
330-364 N	764	305	2	764	305	260	270	237	161	-	-	-	2	1	-	COSTA RICA	(83/100/ -)
300-329 N	481	396	5	481	396	316	481	396	178	-	-	-	5	5	-	DOMINICAN RP	(48/ 80/ -)
270-299 N	3231	1112	4	3011	1072	582	390	78	35	-	-	-	3	1	-	NICARAGUA	(10/100/ -)
240-269 N	6719	3028	5	595	205	120	52	32	31	-	-	-	2	1	-	COSTA RICA	(27/100/ -)
210-239 N	7158	7017	8	7048	6966	5440	2705	2857	2035	-	-	-	7	5	-	EL SALVADOR	(31/ 68/ -)
180-209 N	10388	10293	1	10388	10293	7949	10388	10293	637	-	-	-	1	1	-	MEXICO	(100/100/ -)
150-179 N	10497	4768	1	10497	4768	2571	-	-	-	-	-	-	1	-	-	MEXICO	(100/ -/ -)
120-149 N	10211	3884	1	10211	3884	2691	-	-	-	-	-	-	1	-	-	MEXICO	(100/ -/ -)
90-119 N	1734	917	1	1734	917	766	1734	917	626	-	-	-	1	1	-	MEXICO	(100/100/ -)
75-89 N	1921	446	1	1921	446	297	1921	446	203	-	-	-	1	1	-	MEXICO	(100/100/ -)
Sub-total	65681	34783	10	47401	29692	21399	18417	15679	4248	60	160	118	10	9	1		

TABLE 3.3 - continued

MAJOR CLIMATE 3 COOL TROPICS

365- N	44	3	1	44	3	-	-	-	-	-	-	-	1	-	-	COSTA RICA	(100/ -/ -)
330-364 N	20	5	1	20	5	4	20	5	3	-	-	-	1	1	-	PANAMA	(100/100/ -)
300-329 N	42	21	1	42	21	20	42	21	19	42	21	2	1	1	1	DOMINICAN RP	(100/100/100)
210-239 N	85	158	2	85	158	153	85	158	130	-	-	-	2	2	-	GUATEMALA	(87/ 90/ -)
180-209 N	342	3973	1	342	3973	3943	342	3973	3876	342	3973	3390	1	1	1	MEXICO	(100/100/100)
150-179 N	60	36	1	60	36	23	-	-	-	-	-	-	1	-	-	MEXICO	(100/ -/ -)
Sub-total	646	4199	5	593	4196	4147	489	4157	4030	384	3994	3393	5	4	2		

MAJOR CLIMATE 4 COLD TROPICS

0 Cold	711	4207	5	711	4207	4171	667	4204	4137	667	4204	4070	5	4	4	MEXICO	(96/ 96/ 97)
Sub-total	711	4207	5	711	4207	4171	667	4204	4137	667	4204	4070	5	4	4		

MAJOR CLIMATE 5 MODERATELY COOL/COOL SUB-TROPICS

180-209 N	-	-	-	87	24	18	-	-	-	-	-	-	1	-	-	MEXICO	(100/ -/ -)
150-179 N	1951	1189	1	96	21	16	-	-	-	-	-	-	1	-	-	MEXICO	(100/ -/ -)
90-119 N	87	24	1	-	-	-	87	24	19	87	24	11	-	1	1	MEXICO	(-/100/100)
75-89 N	96	21	1	-	-	-	96	21	18	96	21	11	-	1	1	MEXICO	(-/100/100)
Sub-total	2360	1279	1	183	45	34	183	45	38	183	45	23	1	1	1		

MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)

75-89 N	228	145	1	228	145	114	228	145	61	-	-	-	1	1	-	MEXICO	(100/100/ -)
Sub-total	85202	9697	1	228	145	114	228	145	61	-	-	-	1	1	-		

MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)

75-89 N	3602	625	1	3602	625	235	-	-	-	-	-	-	1	-	-	MEXICO	(100/ -/ -)
Sub-total	10452	1429	1	3602	625	235	-	-	-	-	-	-	1	-	-		

MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)

Sub-total	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-		

MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)

0 Cold	2	1	1	2	1	-	2	1	-	2	1	-	1	1	1	MEXICO	(100/100/100)
Sub-total	2	1	1	2	1	-	2	1	-	2	1	-	1	1	1		

TABLE 3.3 - continued

MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)

90-119 N	641	98	1	641	98	21	-	-	-	-	-	-	1	-	-	MEXICO	(100/ -/ -)
1-74 N	594	98	1	594	98	92	594	98	87	594	98	90	1	1	1	MEXICO	(100/100/100)
Sub-total	4935	733	1	1235	196	114	594	98	87	594	98	90	1	1	1		

CENTRAL AMERICA TOTALS:

271641	106571	21	67341	59135	40101	22095	28668	14266	2143	9234	8021	19	17	7

TABLE 3.3 - continued

EXTENTS AND POPULATIONS OF ALL CRITICAL INDIVIDUAL-COUNTRY LENGTH OF GROWING PERIOD (LGP) ZONE AREAS BY MAJOR CLIMATE AND LGP ZONE

--- SOUTHEAST ASIA ---

LGP ZONE (days)	1 TOTAL land area (1000 ha)	2 TOTAL 1975 Pop. (1000)	3 TOTAL No. of ctrys with zone	LOW INPUTS Crit. area (1000 ha)	LOW INPUTS 1975 Pop. (1000)	LOW INPUTS Excess Pop. (1000)	INTERMEDIATE INPUTS Crit. area (1000 ha)	INTERMEDIATE INPUTS 1975 Pop. (1000)	INTERMEDIATE INPUTS Excess Pop. (1000)	HIGH INPUTS Crit. area (1000 ha)	HIGH INPUTS 1975 Pop. (1000)	HIGH INPUTS Excess Pop. (1000)	4 NUMBER of affected countries L/I/H			5 MOST AFFECTED COUNTRY (LOW/INT./HIGH) Percentage of Total LGP Excess Populations	
MAJOR CLIMATE 1	**WARM TROPICS**																
365+ N	82969	14849	12	1126	2283	946	410	1709	48	410	1709	220	2	1	1	INDONESIA	(99/100/100)
365- N	67998	37817	14	2192	14543	10017	1927	13632	6660	1927	13632	3950	4	3	3	INDONESIA	(42/ 40/ 30)
330-364 N	22639	27904	14	2853	17623	9828	2227	14877	2150	-	-	-	4	2	-	INDONESIA	(80/100/ -)
300-329 N	46845	55628	15	6531	34770	11203	519	4128	1677	519	4128	712	3	1	1	SRI LANKA	(31/100/100)
270-299 N	54300	94781	16	14241	68264	40287	1998	13019	1054	-	-	-	4	1	-	INDONESIA	(9/100/ -)
240-269 N	67473	125477	14	23589	86775	47024	10271	60261	12328	-	-	-	5	3	-	INDIA	(25/ 50/ -)
210-239 N	63934	96574	15	22232	65826	31941	-	-	-	-	-	-	5	-	-	INDIA	(80/ -/ -)
180-209 N	85383	99965	11	43694	79256	42538	-	-	-	-	-	-	1	-	-	INDIA	(100/ -/ -)
150-179 N	59874	90019	10	53134	87140	11966	-	-	-	-	-	-	4	-	-	INDIA	(88/ -/ -)
120-149 N	53489	83079	7	46738	79910	21877	-	-	-	-	-	-	2	-	-	INDIA	(100/ -/ -)
90-119 N	31407	50075	3	65	38	15	-	-	-	-	-	-	1	-	-	SRI LANKA	(100/ -/ -)
1-74 N	15621	10268	2	3923	4019	2037	3923	4019	2018	3923	4019	1981	1	1	1	PAKISTAN	(100/100/100)
0 Dry	5224	4427	2	4756	4241	2544	4756	4241	2544	4756	4241	2544	1	1	1	PAKISTAN	(100/100/100)
Sub-total	666327	803794	22	225074	544688	232229	26031	115886	28485	11535	27729	9410	11	7	4		
MAJOR CLIMATE 2	**MODERATELY COOL TROPICS**																
365+ N	2268	818	8	730	774	655	730	774	516	730	774	443	5	5	5	INDONESIA	(58/ 38/ 36)
365- N	2563	2127	7	1534	2100	1902	1310	1977	1540	1310	1977	1386	6	5	5	INDONESIA	(42/ 41/ 39)
330-364 N	1022	2155	7	953	2153	2047	953	2153	1874	953	2153	1761	6	6	6	INDONESIA	(45/ 25/ 25)
300-329 N	1110	1626	9	1008	1605	1159	240	1043	743	240	1043	698	8	6	6	INDONESIA	(41/ 31/ 31)
270-299 N	952	880	8	796	854	356	122	140	59	34	60	55	6	3	4	SRI LANKA	(14/ 82/ 88)
240-269 N	514	889	7	366	867	750	344	847	581	366	867	532	4	3	4	INDIA	(64/ 77/ 81)
210-239 N	410	277	8	128	242	211	114	218	184	114	218	186	6	4	4	INDIA	(85/ 93/ 89)
180-209 N	460	271	5	170	187	167	35	124	111	83	132	105	4	1	2	INDIA	(57/100/ 99)
150-179 N	61	152	2	61	152	144	13	124	121	13	124	121	2	1	1	INDIA	(86/100/100)
120-149 N	21	124	1	21	124	123	21	124	121	21	124	121	1	1	1	INDIA	(100/100/100)
Sub-total	9381	9319	15	5767	9058	7519	3882	7524	5856	3864	7472	5413	10	9	10		

TABLE 3.3 - continued

MAJOR CLIMATE 3 COOL TROPICS

365+ N	1102	408	8	397	389	351	349	386	324	349	386	296	6	5	5	INDONESIA	(37/ 39/ 39)
365- N	1229	1017	6	702	1003	956	702	1003	920	702	1003	882	4	4	4	INDONESIA	(43/ 44/ 43)
330-364 N	480	1050	6	448	1049	1022	448	1049	1007	448	1049	987	5	5	5	INDONESIA	(45/ 25/ 25)
300-329 N	534	718	6	501	718	675	501	718	625	501	718	583	5	5	5	INDONESIA	(40/ 30/ 30)
270-299 N	444	416	7	439	416	359	439	416	251	372	403	194	6	6	5	PHILIPPINES	(84/ 84/ 80)
240-269 N	221	443	7	221	443	419	163	436	350	163	436	322	7	5	5	INDIA	(58/ 66/ 69)
210-239 N	194	101	8	54	85	77	50	84	68	186	100	70	6	5	6	INDIA	(78/ 84/ 79)
180-209 N	206	137	5	76	96	85	16	64	57	38	68	55	4	2	3	INDIA	(57/ 99/ 98)
150-179 N	28	77	2	28	77	72	4	62	61	4	62	61	2	1	1	INDIA	(86/100/100)
120-149 N	10	62	1	10	62	61	10	62	60	10	62	60	1	1	1	INDIA	(100/100/100)
Sub-total	4448	4429	14	2876	4338	4080	2682	4280	3727	2773	4287	3514	8	8	8		

MAJOR CLIMATE 4 COLD TROPICS

Sub-total	2318	59	1	-	-	-	-	-	-	-	-	-	-	-	-

MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)

270-299 N	4424	5918	4	2782	5197	757	-	-	-	-	-	-	1	-	-	INDIA	(100/ -/ -)
240-269 N	8694	9458	3	3562	6249	441	-	-	-	-	-	-	1	-	-	INDIA	(100/ -/ -)
210-239 N	8998	14128	4	3350	9895	4161	162	429	41	-	-	-	2	1	-	PAKISTAN	(6/100/ -)
180-209 N	7888	32513	3	7888	32513	12444	193	1032	632	193	1032	520	3	1	1	PAKISTAN	(7/100/100)
150-179 N	14293	56327	3	13529	55680	9926	177	739	432	177	739	303	2	1	1	PAKISTAN	(6/100/100)
120-149 N	16419	52963	3	16195	52884	21640	1025	4130	784	-	-	-	2	1	-	PAKISTAN	(13/100/ -)
90-119 N	10019	25455	2	1486	3800	1645	-	-	-	-	-	-	1	-	-	PAKISTAN	(100/ -/ -)
75-89 N	3780	11893	2	3780	11893	8992	3780	11893	7339	3780	11893	4973	2	2	2	INDIA	(68/ 69/ 68)
1-74 N	23917	34783	2	10941	19872	3568	10941	19872	3491	10941	19872	3340	1	1	1	PAKISTAN	(100/100/100)
Sub-total	140680	277659	5	63513	197983	63577	16278	38095	12720	15091	33536	9137	3	2	2		

MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)

365- N	-	-	-	161	171	168	-	-	-	-	-	-	1	-	-	PAKISTAN	(100/ -/ -)
270-299 N	464	353	4	127	276	194	107	247	121	107	247	133	2	1	1	INDIA	(94/100/100)
240-269 N	986	413	4	605	330	114	-	-	-	-	-	-	2	-	-	NEPAL	(94/ -/ -)
210-239 N	1396	1295	5	1037	1253	867	1037	1253	387	1035	1250	458	3	3	2	INDIA	(57/ 57/ 53)
180-209 N	789	1169	3	681	1155	871	681	1155	354	681	1155	138	2	2	2	NEPAL	(43/ 43/ 86)
150-179 N	809	1055	3	750	1054	756	750	1054	397	388	559	172	2	2	1	NEPAL	(55/ 59/100)
120-149 N	956	541	3	560	293	133	560	293	9	560	293	4	1	1	1	NEPAL	(100/100/100)
75-89 N	161	171	1	-	-	-	161	171	160	161	171	137	-	1	1	PAKISTAN	(-/100/100)
1-74 N	30	60	1	30	60	59	30	60	59	30	60	59	1	1	1	PAKISTAN	(100/100/100)
Sub-total	8932	5698	5	3951	4592	3165	3326	4233	1490	2962	3735	1103	4	4	3		

TABLE 3.3 - continued

MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)

300-329 N	1500	188	4	648	126	56	302	37	8	2	3	2	3	2	1	NEPAL	(5/ 28/100)
270-299 N	213	175	4	183	172	143	54	138	126	84	141	125	3	2	3	INDIA	(82/ 92/ 92)
240-269 N	463	204	4	463	204	130	116	103	22	116	103	15	4	1	1	NEPAL	(64/100/100)
210-239 N	678	647	4	678	647	516	510	625	378	510	625	383	4	3	3	INDIA	(57/ 60/ 56)
180-209 N	373	553	3	320	546	420	320	546	208	140	237	128	2	2	1	NEPAL	(48/ 57/100)
150-179 N	370	527	3	351	526	404	351	526	238	351	526	173	2	2	2	NEPAL	(57/ 63/ 93)
120-149 N	453	271	3	272	146	91	272	146	21	272	146	20	1	1	1	NEPAL	(100/100/100)
75-89 N	81	81	1	81	81	79	81	81	73	81	81	64	1	1	1	PAKISTAN	(100/100/100)
1-74 N	12	34	1	12	34	33	12	34	33	12	34	33	1	1	1	PAKISTAN	(100/100/100)
Sub-total	4263	2749	5	3008	2482	1877	2018	2236	1112	1568	1896	947	5	4	4		

MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)

0 Cold	18803	5378	5	7508	2037	1661	7508	2037	1286	7000	1968	567	4	4	3	NEPAL	(69/ 70/ 77)
Sub-total	18803	5378	5	7508	2037	1661	7508	2037	1286	7000	1968	567	4	4	3		

MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)

240-269 N	119	147	1	119	147	136	119	147	113	119	147	114	1	1	1	PAKISTAN	(100/100/100)
210-239 N	223	225	1	223	225	168	-	-	-	-	-	-	1	-	-	PAKISTAN	(100/ -/ -)
180-209 N	154	568	1	154	568	535	154	568	437	154	568	346	1	1	1	PAKISTAN	(100/100/100)
150-179 N	122	422	1	122	422	413	122	422	395	122	422	391	1	1	1	PAKISTAN	(100/100/100)
120-149 N	115	272	1	115	272	266	115	272	251	115	272	258	1	1	1	PAKISTAN	(100/100/100)
90-119 N	29	122	1	29	122	120	29	122	116	29	122	113	1	1	1	PAKISTAN	(100/100/100)
Sub-total	15912	2663	1	762	1756	1641	539	1531	1313	539	1531	1225	1	1	1		

MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)

Sub-total	26551	5970	2	-	-	-	-	-	-	-	-	-	-	-	-		

SOUTHEAST ASIA TOTALS:

	897615	1117719	24	312459	766934	315753	62264	175822	55993	45332	82154	31321	16	15	14		

TABLE 3.3 - continued

EXTENTS AND POPULATIONS OF ALL CRITICAL INDIVIDUAL-COUNTRY LENGTH OF GROWING PERIOD (LGP) ZONE AREAS BY MAJOR CLIMATE AND LGP ZONE

-- TOTAL FOR FIVE DEVELOPING REGIONS -

LGP ZONE (days)	TOTAL land area (1000 ha)[1]	TOTAL 1975 Pop. (1000)[2]	TOTAL No. of ctrys with zone[3]	LOW INPUTS			INTERMEDIATE INPUTS			HIGH INPUTS			NUMBER of affected countries L/I/H[4]			MOST AFFECTED COUNTRY (LOW/INT./HIGH)[5]	Percentage of Total LGP Excess Populations
				Crit. area (1000 ha)	1975 Pop. (1000)	Excess Pop. (1000)	Crit. area (1000 ha)	1975 Pop. (1000)	Excess Pop. (1000)	Crit. area (1000 ha)	1975 Pop. (1000)	Excess Pop. (1000)	L	I	H		
MAJOR CLIMATE 1 WARM TROPICS																	
365+ N	213150	18631	18	1126	2283	946	410	1709	48	410	1709	220	2	1	1	INDONESIA	(99/100/100)
365- N	347645	58859	34	2258	14748	10108	1993	13837	6705	1927	13632	3950	5	4	3	INDONESIA	(42/ 40/ 30)
330-364 N	183412	54240	49	4099	20331	10931	2287	14961	2234	206	793	168	8	3	2	INDONESIA	(72/ 96/ -)
300-329 N	399960	91325	57	7341	36749	12194	593	4519	1810	519	4128	712	9	3	1	SRI LANKA	(29/ 93/100)
270-299 N	369880	147875	54	24574	84635	44280	2590	15387	1787	-	-	-	9	2	-	INDONESIA	(9/ 59/ -)
240-269 N	335849	169765	61	38612	101372	49200	10478	61060	12608	207	799	134	17	5	2	INDIA	(25/ 49/ -)
210-239 N	272105	134663	60	24506	69791	34003	-	-	-	-	-	-	11	-	-	INDIA	(76/ -/ -)
180-209 N	351142	144596	51	72777	94310	45365	36	17	4	-	-	-	9	1	-	RWANDA	(-/100/ -)
150-179 N	282102	137481	49	72326	101561	18141	1942	3156	533	-	-	-	13	4	-	GHANA	(10/ 83/ -)
120-149 N	203625	120799	40	133138	112144	40424	1624	1355	202	-	-	-	17	1	-	VENEZUELA	(3/100/ -)
90-119 N	106585	65062	27	47505	11400	7285	16912	7425	2321	-	-	-	13	7	-	NIGERIA	(27/ 26/ -)
75-89 N	73663	24496	22	59872	10580	6505	19588	5994	3272	-	-	-	14	6	-	NIGER	(23/ 36/ -)
1-74 N	400779	39749	21	306215	24872	17581	306215	24872	14844	231154	23310	10523	15	15	12	ETHIOPIA	(25/ 27/ 31)
0 Dry	297657	15426	22	293593	14109	10987	293593	14109	10987	293593	14109	10987	20	20	20	ETHIOPIA	(25/ 25/ 25)
1-74 I	82964	3115	12	56719	2615	1623	21764	2227	1311	21764	2227	1167	9	7	7	ZIMBABWE	(20/ 23/ 23)
75-89 I	53206	7138	13	14549	2468	1611	5817	1627	775	26	9	-	7	3	1	YEMEN DEM	(50/ 79/ -)
90-119 I	70162	6182	10	26680	2774	1924	12	821	821	12	821	821	5	1	1	MOZAMBIQUE	(43/100/100)
120-149 I	6106	84	4	43	8	3	-	-	-	-	-	-	1	-	-	SWAZILAND	(100/ -/ -)
Sub-total	4064216	1239739	104	1185933	706757	313120	685854	173080	60269	549818	61539	28685	71	51	37		

TABLE 3.3 - continued

MAJOR CLIMATE 2 MODERATELY COOL TROPICS

365+ N	2268	818	8	730	774	655	730	774	516	730	774	443	5	5	5 INDONESIA	(58/ 38/ 36)
365- N	11999	4246	19	10536	4217	3891	8122	4017	3186	1434	2260	1622	16	13	7 INDONESIA	(29/ 28/ 36)
330-364 N	17610	7662	20	17541	7660	7181	13437	7295	5540	1132	2623	2063	19	15	9 COLOMBIA	(39/ 25/ -)
300-329 N	7551	3132	26	6350	3035	2225	3357	2165	1482	474	1462	817	23	17	8 INDONESIA	(27/ 23/ 29)
270-299 N	15941	4930	28	7349	4539	3269	2939	2621	1867	666	1428	341	22	14	5 RWANDA	(40/ 63/ 84)
240-269 N	20726	10191	28	10560	6924	5051	2791	3186	1219	435	1004	572	17	10	5 INDIA	(9/ 37/ 76)
210-239 N	17681	11230	32	13739	10653	7687	3453	3451	2454	227	402	246	24	14	6 EL SALVADOR	(22/ 57/ -)
180-209 N	20653	13274	18	19431	13169	9028	11481	10921	1196	209	521	282	14	6	4 MEXICO	(88/ 53/ -)
150-179 N	16975	8714	14	15695	8495	4958	1823	2605	899	24	135	129	10	6	2 INDIA	(2/ 14/ 94)
120-149 N	20693	6735	14	17913	6197	4071	1927	894	421	46	138	131	11	6	2 INDIA	(3/ 29/ 93)
90-119 N	12342	3488	13	11673	3179	2566	11287	3156	2050	3355	904	596	12	11	5 ETHIOPIA	(17/ 19/ 44)
75-89 N	5742	1576	9	5689	1564	1340	5714	1576	1063	2548	738	444	7	8	5 ETHIOPIA	(43/ 48/ 88)
1-74 N	14391	2775	8	2590	610	538	2565	598	501	2565	598	464	8	7	7 PERU	(50/ 53/ 55)
0 Dry	12170	3393	5	9451	3393	3393	9451	3393	3393	9451	3393	3393	3	3	3 PERU	(95/ 95/ 95)
1-74 I	3361	156	5	823	129	109	823	129	103	823	129	100	3	3	3 SAUDI ARABIA	(87/ 90/ 90)
75-89 I	2730	295	4	2730	295	265	2599	294	250	2599	294	203	4	3	3 SAUDI ARABIA	(62/ 64/ 75)
120-149 I	212	89	2	46	5	1	-	-	-	-	-	-	1	-	- BOLIVIA	(100/ -/ -)
150-179 I	71	87	1	71	87	18	71	87	7	-	-	-	1	1	- ECUADOR	(100/100/ -)
Sub-total	205864	82943	55	152917	74933	56253	82570	47168	26154	26718	16808	11852	47	42	29	

MAJOR CLIMATE 3 COOL TROPICS

365+ N	1102	408	8	397	389	351	349	386	324	349	386	296	6	5	5 INDONESIA	(37/ 39/ 39)
365- N	2230	1392	12	1703	1378	1323	1659	1375	1257	1082	1275	1088	10	9	8 INDONESIA	(36/ 38/ 39)
330-364 N	6394	2983	17	6362	2982	2872	6021	2945	2614	534	1302	1211	16	15	9 INDONESIA	(23/ 17/ 24)
300-329 N	2545	1380	17	2512	1380	1242	1503	1236	1029	733	1004	786	16	13	9 INDONESIA	(27/ 23/ 26)
270-299 N	4566	1727	20	1972	1596	1463	1777	1546	1222	1183	1462	858	17	16	11 RWANDA	(41/ 47/ 59)
240-269 N	6361	2823	23	4272	2577	2168	929	936	616	195	501	353	17	12	6 INDIA	(11/ 38/ 63)
210-239 N	5203	2636	23	3107	2331	1791	402	982	770	258	673	571	16	11	8 BURUNDI	(28/ 64/ 83)
180-209 N	5428	5447	16	3853	5139	4380	424	4224	4107	414	4224	3573	11	5	5 MEXICO	(90/ 94/ 95)
150-179 N	5499	1643	13	1649	997	686	414	558	319	4	62	61	6	3	1 INDIA	(9/ 19/100)
120-149 N	5928	1725	12	3695	1411	1028	1931	947	451	262	96	82	9	6	2 INDIA	(6/ 13/ 74)
90-119 N	8681	2025	10	4304	1379	1189	4047	1348	989	4027	1347	764	9	7	6 YEMEN DEM	(53/ 53/ 55)
75-89 N	1331	428	6	1315	428	401	1315	428	344	1169	371	234	4	4	3 ETHIOPIA	(71/ 74/ 83)
1-74 N	692	126	6	668	126	120	668	126	110	668	126	98	4	4	4 KENYA	(59/ 58/ 55)
0 Dry	6594	348	6	5231	348	348	5231	348	348	5231	348	348	3	3	3 BOLIVIA	(76/ 76/ 76)
1-74 I	4102	227	6	2882	220	195	2882	220	182	2882	220	157	5	5	5 BOLIVIA	(81/ 82/ 80)
75-89 I	3254	263	5	3190	263	256	3190	263	245	3190	263	226	4	4	4 BOLIVIA	(58/ 58/ 60)
90-119 I	1621	157	2	1590	157	126	1590	157	66	-	-	-	1	1	- BOLIVIA	(100/100/ -)
Sub-total	71531	25748	49	48702	23111	19946	34332	18033	15000	22181	13666	10711	39	37	29	

MAJOR CLIMATE 4 COLD TROPICS

0 Cold	37263	11408	17	33758	11309	9622	24541	10536	8082	8156	7619	5988	14	12	11 MEXICO	(42/ 49/ 66)
Sub-total	37263	11408	17	33758	11309	9622	24541	10536	8082	8156	7619	5988	14	12	11	

TABLE 3.3 - continued

MAJOR CLIMATE 5 MODERATELY COOL/COOL SUB-TROPICS

180-209 N	38940	15333	4	87	24	18	-	-	-	-	-	-	1	-	-	MEXICO	(100/ -/ -)
150-179 N	26761	7893	4	96	21	16	-	-	-	-	-	-	1	-	-	MEXICO	(100/ -/ -)
90-119 N	377	38	2	-	-	-	87	24	19	87	24	11	-	1	1	MEXICO	(-/100/100)
75-89 N	96	21	1	-	-	-	96	21	18	96	21	11	-	1	1	MEXICO	(-/100/100)
Sub-total	130807	38087	5	183	45	34	183	45	38	183	45	23	1	1	1		

MAJOR CLIMATE 6 TRANSITIONAL MODERATELY COOL SUB-TROPICS

270-299 N	5469	2150	2	412	1282	378	-	-	-	-	-	-	1	-	-	URUGUAY	(100/ -/ -)
Sub-total	61668	10440	3	412	1282	378	-	-	-	-	-	-	1	-	-		

MAJOR CLIMATE 7 WARM SUB-TROPICS (SUMMER RAINFALL)

270-299 N	5097	5930	6	2782	5197	757	-	-	-	-	-	-	1	-	-	INDIA	(100/ -/ -)
240-269 N	9626	10092	6	3590	6264	442	-	-	-	-	-	-	2	-	-	INDIA	(100/ -/ -)
210-239 N	13360	14457	8	3350	9895	4161	162	429	41	-	-	-	2	1	-	PAKISTAN	(6/100/ -)
180-209 N	11734	33136	7	7990	32518	12446	193	1032	632	193	1032	520	4	1	1	PAKISTAN	(7/100/100)
150-179 N	16768	56862	4	13529	55680	9926	177	739	432	177	739	303	2	1	1	PAKISTAN	(6/100/100)
120-149 N	16974	53149	4	16195	52884	21640	1025	4130	784	-	-	-	2	1	-	PAKISTAN	(13/100/ -)
90-119 N	10207	25549	3	1486	3800	1645	-	-	-	-	-	-	1	-	-	PAKISTAN	(100/ -/ -)
75-89 N	4008	12038	3	4008	12038	9106	4008	12038	7400	3780	11893	4973	3	3	2	INDIA	(67/ 69/ 68)
1-74 N	72259	40653	3	10941	19872	3568	10941	19872	3491	10941	19872	3340	1	1	1	PAKISTAN	(100/100/100)
0 Dry	300373	26580	15	227602	1256	1218	227602	1256	1218	227602	1256	1218	11	11	11	EGYPT	(56/ 56/ 56)
1-74 I	17735	525	4	3012	89	69	3012	89	49	2454	80	9	2	2	1	BOTSWANA	(91/ 92/100)
75-89 I	3836	201	2	684	53	17	-	-	-	-	-	-	1	-	-	BOTSWANA	(100/ -/ -)
90-119 I	12041	489	3	258	57	4	-	-	-	-	-	-	1	-	-	SWAZILAND	(100/ -/ -)
120-149 I	10293	501	4	30	2	2	30	2	2	30	2	2	1	1	1	BOLIVIA	(100/100/100)
150-179 I	9987	800	4	408	21	20	408	21	15	-	-	-	1	1	-	BOLIVIA	(100/100/ -)
Sub-total	536325	293654	21	295865	199628	65028	247558	39609	14067	245177	34875	10367	17	15	14		

TABLE 3.3 - continued

MAJOR CLIMATE 8 MODERATELY COOL SUB-TROPICS (SUMMER RAINFALL)

365+	N	5419	2021	1	5419	2021	772	-	-	-	-	-	-	1	-	-	BRAZIL	(100/ -/ -)
365-	N	2658	880	1	2819	1051	364	-	-	-	-	-	-	2	-	-	BRAZIL	(54/ -/ -)
330-364	N	418	127	1	418	127	38	-	-	-	-	-	-	1	-	-	BRAZIL	(100/ -/ -)
270-299	N	464	353	4	127	276	194	107	247	121	107	247	133	2	1	1	INDIA	(94/100/100)
240-269	N	1011	417	5	605	330	114	-	-	-	-	-	-	2	-	-	NEPAL	(94/ -/ -)
210-239	N	1421	1299	6	1037	1253	867	1037	1253	387	1035	1250	458	3	3	2	INDIA	(57/ 57/ 53)
180-209	N	1160	1304	4	1052	1290	894	681	1155	354	681	1155	138	3	2	2	NEPAL	(42/ 43/ 86)
150-179	N	809	1055	3	750	1054	756	750	1054	397	388	559	172	2	2	1	NEPAL	(55/ 59/100)
120-149	N	5413	1094	4	560	293	133	560	293	9	560	293	4	1	1	1	NEPAL	(100/100/100)
75-89	N	3763	796	2	3602	625	235	161	171	160	161	171	137	1	1	1	PAKISTAN	(-/100/100)
1-74	N	30	60	1	30	60	59	30	60	59	30	60	59	1	1	1	PAKISTAN	(100/100/100)
0 Dry		14689	307	7	14497	293	132	14497	293	132	14497	293	132	4	4	4	ARGENTINA	(93/ 93/ 93)
1-74	I	13416	760	3	353	78	75	353	78	72	353	78	69	1	1	1	LESOTHO	(100/100/100)
75-89	I	880	94	2	80	45	44	80	45	44	80	45	43	1	1	1	LESOTHO	(100/100/100)
90-119	I	885	149	2	194	96	69	194	96	45	194	96	50	1	1	1	LESOTHO	(100/100/100)
120-149	I	1041	230	2	261	126	83	261	126	50	-	-	-	1	1	-	LESOTHO	(100/100/ -)
150-179	I	1161	328	2	1161	328	105	-	-	-	-	-	-	2	-	-	LESOTHO	(70/ -/ -)
Sub-total		60832	12280	13	32965	9347	4941	18711	4871	1835	18086	4247	1400	11	9	8		

MAJOR CLIMATE 9 COOL SUB-TROPICS (SUMMER RAINFALL)

365+	N	387	116	1	387	116	56	-	-	-	-	-	-	1	-	-	BRAZIL	(100/ -/ -)
300-329	N	8435	3360	5	7583	3298	2166	7237	3209	727	2	3	2	4	3	1	ARGENTINA	(97/ 99/ -)
270-299	N	3343	1548	6	3313	1545	1044	54	138	126	84	141	125	5	2	3	INDIA	(11/ 92/ 92)
240-269	N	2224	972	6	473	208	134	126	107	26	126	107	17	5	2	2	NEPAL	(62/ 86/ 86)
210-239	N	3087	1730	6	688	649	518	520	627	380	520	627	384	5	4	4	INDIA	(57/ 60/ 56)
180-209	N	606	621	5	368	549	423	368	549	211	188	240	131	3	3	2	NEPAL	(47/ 56/ 98)
150-179	N	370	527	3	351	526	404	351	526	238	351	526	173	2	2	2	NEPAL	(57/ 63/ 93)
120-149	N	453	271	3	272	146	91	272	146	21	272	146	20	1	1	1	NEPAL	(100/100/100)
75-89	N	81	81	1	81	81	79	81	81	73	81	81	64	1	1	1	PAKISTAN	(100/100/100)
1-74	N	12	34	1	12	34	33	12	34	33	12	34	33	1	1	1	PAKISTAN	(100/100/100)
0 Dry		7958	243	8	2010	8	4	2010	8	4	2010	8	4	4	4	4	CHILE	(26/ 26/ 26)
1-74	I	2699	132	3	2515	132	115	2515	132	108	2515	132	95	2	2	2	ARGENTINA	(66/ 65/ 60)
75-89	I	900	50	3	147	27	26	147	27	26	147	27	25	2	2	2	LESOTHO	(86/ 87/ 88)
90-119	I	8388	1207	3	112	50	40	112	50	26	112	50	29	2	2	2	LESOTHO	(98/ 97/ 99)
120-149	I	1089	331	2	126	65	54	126	65	38	-	-	-	1	1	-	LESOTHO	(100/100/ -)
150-179	I	1298	530	2	1298	530	157	-	-	-	-	-	-	2	-	-	ARGENTINA	(52/ -/ -)
Sub-total		43371	12604	16	19736	7964	5352	13931	5699	2043	6420	2122	1108	14	11	11		

MAJOR CLIMATE 10 COLD SUB-TROPICS (SUMMER RAINFALL)

0 Cold		36087	6039	10	7695	2090	1705	7695	2090	1320	7187	2021	583	6	6	5	NEPAL	(67/ 69/ 75)
Sub-total		36087	6039	10	7695	2090	1705	7695	2090	1320	7187	2021	583	6	6	5		

TABLE 3.3 - continued

MAJOR CLIMATE 11 COOL SUB-TROPICS (WINTER RAINFALL)

365+ N	3484	376	1	3484	376	124	-	-	-	-	-	-	1	-	-	CHILE (100/ -/ -)
365- N	921	115	1	921	115	72	-	-	-	-	-	-	1	-	-	CHILE (100/ -/ -)
330-364 N	1319	498	3	1076	165	137	20	52	48	20	52	39	2	1	1	TURKEY (37/100/100)
300-329 N	834	378	3	196	200	187	196	200	155	196	200	47	1	1	1	TURKEY (100/100/100)
270-299 N	2220	1134	3	1325	953	842	1325	953	456	-	-	-	1	1	-	TURKEY (100/100/ -)
240-269 N	4611	2419	5	1781	1619	1215	1697	1585	198	119	147	114	3	2	1	PAKISTAN (11/ 57/100)
210-239 N	15733	13538	9	15733	13538	8733	88	200	13	-	-	-	9	1	-	LEBANON (1/100/ -)
180-209 N	19151	20635	13	17169	19844	14057	4237	9508	2980	1009	3813	1962	10	6	4	ISRAEL (12/ 43/ 40)
150-179 N	20374	13760	13	7836	6798	3573	939	3144	1673	602	1843	1538	7	4	3	LEBANON (26/ 52/ 56)
120-149 N	23859	12552	14	13020	7673	4727	599	706	410	115	272	258	9	2	1	PAKISTAN (6/ 61/100)
90-119 N	46878	22769	15	20461	8923	4306	6706	3903	977	469	816	576	12	7	4	EGYPT (6/ 26/ 45)
75-89 N	5978	1715	6	3125	1442	1074	1621	1164	567	759	769	311	3	2	1	TURKEY (68/ 95/100)
1-74 N	41987	8520	6	17082	4100	1584	17082	4100	1336	6450	1383	860	3	3	2	CHILE (55/ 62/ 89)
0 Dry	733777	51339	27	379944	8623	6444	379944	8623	6444	379944	8623	6444	15	15	15	SAUDI ARABIA(35/ 35/ 35)
1-74 I	84082	15430	12	38244	4975	3502	33674	4852	2757	16170	3832	2103	7	6	5	MOROCCO (46/ 50/ 51)
75-89 I	13350	8355	11	7826	6944	4870	6034	6145	4599	6034	6145	4177	8	7	7	EGYPT (52/ 55/ 60)
Sub-total	1021561	174426	29	529223	86292	55454	454162	45137	22619	411887	27895	18435	27	27	24	

MAJOR CLIMATE 12 COLD SUB-TROPICS (WINTER RAINFALL)

0-Cold	137573	42615	12	111022	36645	27534	108954	36503	22048	108954	36503	11152	10	9	9	AFGHANISTAN (38/ 40/ 50)
Sub-total	137573	42615	12	111022	36645	27534	108954	36503	22048	108954	36503	11152	10	9	9	

MAJOR CLIMATE 13 COOL TEMPERATE

90-119 N	1951	327	3	1367	84	65	1367	84	44	1367	84	20	2	2	2	IRAN (97/ 96/ 90)
75-89 N	10269	793	4	5951	762	110	169	104	49	169	104	90	3	1	1	TURKEY (83/100/100)
1-74 N	46364	670	2	13755	391	327	13755	391	239	13755	391	86	1	1	1	CHILE (100/100/100)
Sub-total	66872	2569	4	21073	1237	502	15291	579	333	15291	579	197	4	4	4	

MAJOR CLIMATE 14 COLD TEMPERATE

0 Cold	20965	4025	4	13502	3949	3273	13502	3949	2598	13502	3949	1248	2	2	2	TURKEY (74/ 72/ 58)
Sub-total	20965	4025	4	13502	3949	3273	13502	3949	2598	13502	3949	1248	2	2	2	

FIVE REGION TOTALS:

6494935	1956581	121	2452986	1164595	563150	1707284	387303	176412	1433560	211871	101756	101	92	78

1. Land area derived from FAO/UNESCO Soil Map excluding areas mapped as water bodies.

2. UN 1975 Population data, UN 1979 .

3. Number of countries containing LGP zone.

4. Number of countries (Low/Intermediate/High) containing the critical LGP zone.

5. Most affected country in terms of containing the highest percentage of excess population in the critical LGP zone.

Abbreviations:

Crit.: Critical
ctrys: Countries
Pop.: Population
No.: Number
L: Low inputs
I: Intermediate inputs
H: High inputs

TABLE 3.4 PRESENT AND PROJECTED POPULATIONS SUPPORTING CAPACITIES BY LOCATION
AFRICA, SOUTHWEST ASIA, SOUTH AMERICA, CENTRAL AMERICA AND SOUTHEAST ASIA
(density - person per hectare)

LOCATION	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	----- YEAR 1975 ----- POTENTIAL POPULATION SUPPORTING CAPACITY			YEAR[3] 2000 POP (mill)	YEAR 2000 POP DENSITY	----- YEAR 2000 ----- POTENTIAL POPULATION SUPPORTING CAPACITY		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS			LOW INPUTS	INTER INPUTS	HIGH INPUTS
TOTAL FOR FIVE REGIONS	6494.9	1956.6	0.30	0.61	2.11	5.05	3589.7	0.55	0.86	2.30	5.11
AFRICA	2878.1	380.2	0.13	0.39	1.53	4.47	780.1	0.27	0.44	1.56	4.47
ALGERIA	237.8	15.7	0.07	0.03*	0.10	0.20	36.0	0.15	0.05*	0.12*	0.21
ANGOLA	123.9	6.2	0.05	0.43	2.25	7.52	11.8	0.09	0.43	2.23	7.50
BENIN	11.3	3.0	0.27	0.56	2.52	9.08	6.5	0.58	0.55*	2.48	8.93
BOTSWANA	60.0	0.7	0.01	0.02	0.08	0.77	1.4	0.02	0.02*	0.08	0.77
BURUNDI	2.6	3.9	1.52	0.33*	1.78	4.05	7.8	3.03	0.31*	1.65*	3.74
CAMEROON	47.2	7.5	0.16	1.63	4.43	12.98	13.0	0.28	1.62	4.41	12.91
CAPE VERDE	0.4	0.3	0.74	<0.01*	<0.01*	0.02*	0.4	1.06	<0.01*	0.01*	0.01*
CENT AFR	62.3	2.0	0.03	0.72	3.40	9.59	3.6	0.06	0.72	3.40	9.58
CHAD	127.5	4.3	0.03	0.11	0.55	2.41	8.0	0.06	0.11	0.55	2.40
COMOROS	0.2	0.3	1.40	0.59*	2.48	4.86	0.4	2.07	0.57*	2.39	4.68
CONGO	34.2	1.4	0.04	1.18	4.75	11.85	2.5	0.07	1.19	4.75	11.84
EGYPT	99.1	36.9	0.37	0.62	0.62	0.62	64.7	0.65	1.14	1.14	1.14
EQ GUINEA	2.8	0.3	0.12	1.39	4.10	12.03	0.6	0.20	1.39	4.09	11.97
ETHIOPIA	120.8	28.8	0.24	0.14*	0.57	2.56	55.3	0.46	0.17*	0.59	2.54
GABON	26.2	0.5	0.02	1.59	4.84	10.71	0.8	0.03	1.59	4.84	10.70
GAMBIA	1.1	0.5	0.46	0.69	2.99	9.95	1.0	0.90	1.08	3.25	9.94
GHANA	22.6	10.0	0.44	0.90	3.92	10.80	21.2	0.94	0.97	3.94	10.58
GUINEA	24.6	4.4	0.18	0.61	2.20	7.10	8.2	0.33	0.61	2.18	7.07
GUIN BISSAU	3.6	0.5	0.15	0.64	2.50	8.12	0.8	0.23	0.64	2.49	8.08
IVORY COAST	31.5	6.7	0.21	1.52	5.22	11.82	13.9	0.44	1.51	5.15	11.67
KENYA	57.0	13.5	0.24	0.06*	0.21*	0.93	33.6	0.59	0.10*	0.24*	0.91
LESOTHO	3.0	1.2	0.39	0.18*	0.45	1.04	2.1	0.69	0.18*	0.45*	1.02
LIBERIA	11.1	1.6	0.14	0.85	4.29	11.39	3.5	0.31	0.86	4.24	11.24
LIBYA	175.9	2.4	0.01	0.01*	0.02	0.04	5.8	0.03	0.04	0.05	0.06
MADAGASCAR	58.0	7.7	0.13	0.83	3.31	9.65	15.1	0.26	0.96	3.38	9.65
MALAWI	8.8	5.2	0.59	0.76	2.75	6.47	11.9	1.35	0.83*	2.72	6.24
MALI	124.0	5.8	0.05	0.06	0.28	1.38	11.6	0.09	0.08*	0.30	1.38
MAURITANIA	103.1	1.4	0.01	<0.01*	0.02	0.08	2.9	0.03	0.01*	0.03*	0.09
MAURITIUS	0.2	0.9	4.85	3.47*	6.19	4.89	1.3	7.09	3.33*	6.08*	5.64*
MOROCCO	44.4	17.3	0.39	0.28*	0.61	1.05	36.1	0.81	0.64*	0.94	1.34
MOZAMBIQUE	78.3	9.2	0.12	0.49	2.00	6.83	18.2	0.23	0.50	2.01	6.81
NAMIBIA	82.3	0.9	0.01	<0.01*	0.03	0.39	1.7	0.02	0.01*	0.03	0.39
NIGER	126.1	4.6	0.04	<0.01*	0.02*	0.34	9.7	0.08	0.01*	0.02*	0.34
NIGERIA	91.2	65.7	0.72	0.59*	2.39	8.12	148.9	1.63	0.60*	2.26	7.68
REUNION	0.3	0.5	1.92	0.39*	1.92*	6.39	0.7	2.73	0.37*	1.83*	6.10
RWANDA	2.5	4.1	1.62	0.29*	1.42*	3.22	9.0	3.53	0.29*	1.35*	3.01*
SAO TOME ETC	0.1	0.1	0.87	1.72	6.27	8.44	0.1	0.96	1.72	6.24	8.40
SENEGAL	19.6	5.0	0.25	0.23*	0.99	5.34	9.7	0.49	0.39*	1.14	5.40
SIERRA LEONE	7.2	3.0	0.42	0.72	3.88	6.97	6.1	0.84	0.75*	3.81	6.85
SOMALIA	63.6	3.2	0.05	0.02*	0.04*	0.11	6.3	0.10	0.03*	0.05*	0.12
SUDAN	250.5	16.0	0.06	0.24	0.95	4.14	31.3	0.12	0.32	1.04	4.21
SWAZILAND	1.7	0.5	0.28	0.49	2.06	3.76	0.9	0.54	0.48*	2.03	3.71
TANZANIA	88.9	15.4	0.17	0.40	1.62	5.63	33.8	0.38	0.43	1.64	5.59
TOGO	5.6	2.3	0.42	0.70	3.29	9.35	5.0	0.90	0.74*	3.28	9.12
TUNISIA	16.3	5.6	0.34	0.15*	0.38	0.74	9.6	0.59	0.41*	0.62	0.95
UGANDA	20.0	11.3	0.57	0.55*	2.20	7.72	24.6	1.23	0.56*	2.15	7.49
UPPER VOLTA	27.1	6.1	0.22	0.20*	0.98	5.04	11.8	0.44	0.22*	0.99	4.99
WESTN SAHARA	26.6	0.1	<0.01	<0.01*	<0.01*	<0.01*	0.2	0.01	<0.01*	<0.01*	<0.01*
ZAIRE	232.2	24.5	0.11	1.26	5.52	12.44	46.2	0.20	1.25	5.52	12.38
ZAMBIA	74.3	4.8	0.06	0.66	2.91	10.32	10.4	0.14	0.66	2.89	10.27
ZIMBABWE	38.6	6.2	0.16	0.27	1.26	4.83	14.0	0.36	0.34*	1.32	4.78

TABLE 3.4 contd.

LOCATION	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	----- YEAR 1975 ----- POTENTIAL POPULATION SUPPORTING CAPACITY LOW INPUTS	INTER INPUTS	HIGH INPUTS	YEAR[3] 2000 POP (mill)	YEAR 2000 POP DENSITY	----- YEAR 2000 ----- POTENTIAL POPULATION SUPPORTING CAPACITY LOW INPUTS	INTER INPUTS	HIGH INPUTS
SOUTHWEST ASIA	677.4	136.3	0.20	0.16	0.25	0.40	264.7	0.39	0.27	0.35	0.48
AFGHANISTAN	64.8	19.3	0.30	0.18*	0.23*	0.32	36.7	0.57	0.24*	0.29*	0.38*
BAHRAIN	0.1	0.3	4.27	<0.01*	<0.01*	<0.01*	0.5	8.97	<0.01*	<0.01*	<0.01*
IRAN	164.8	32.7	0.20	0.17*	0.23	0.33	65.4	0.40	0.25*	0.31*	0.40
IRAQ	43.5	11.0	0.25	0.21*	0.45	0.80	24.3	0.56	0.21*	0.41*	0.68
ISRAEL	2.1	3.5	1.67	0.64*	1.03*	1.48*	5.6	2.72	0.85*	1.11*	1.37*
JORDAN	9.8	2.7	0.28	0.07*	0.11*	0.14*	5.9	0.60	0.09*	0.14*	0.16*
KUWAIT	1.6	1.0	0.63	<0.01*	0.01*	0.01*	3.2	1.98	<0.01*	<0.01*	0.01*
LEBANON	1.0	2.8	2.69	0.67*	1.12*	1.31*	4.9	4.70	1.07*	1.43*	1.57*
QATAR	2.2	0.2	0.08	<0.01*	<0.01*	<0.01*	0.4	0.20	<0.01*	<0.01*	<0.01*
SAUDI ARABIA	215.0	7.2	0.03	0.01*	0.01*	0.02*	15.6	0.07	0.01*	0.01*	0.03*
SYRIA	18.5	7.4	0.40	0.29*	0.69	1.06	16.3	0.88	0.54*	0.84*	1.17
OMAN	21.2	0.8	0.04	<0.01*	<0.01*	<0.01*	1.6	0.08	<0.01*	<0.01*	<0.01*
TURKEY	76.9	40.1	0.52	0.58	1.00	1.54	69.4	0.90	1.21	1.58	2.07
UNITED ARAB EMIRATES	8.4	0.6	0.07	0.01*	0.01*	0.01*	1.6	0.20	0.02*	0.02*	0.02*
YEMEN ARAB REP	19.5	5.3	0.27	0.13*	0.19*	0.39	10.0	0.51	0.18*	0.24*	0.46*
YEMEN DEM	28.2	1.7	0.06	0.03*	0.04*	0.07	3.4	0.12	0.04*	0.04*	0.07*
SOUTH AMERICA	1770.2	215.8	0.12	0.72	2.92	6.97	392.6	0.22	0.78	2.96	6.99
ARGENTINA	278.9	25.4	0.09	0.52	1.52	3.31	32.9	0.12	0.58	1.57	3.36
BOLIVIA	109.9	4.9	0.04	0.70	2.75	6.61	9.3	0.08	0.72	2.77	6.62
BRAZIL	851.3	109.7	0.13	0.70	3.49	8.39	212.5	0.25	0.73	3.50	8.36
CHILE	75.7	10.2	0.13	0.17	0.34	0.59	14.9	0.20	0.34	0.51	0.75
COLOMBIA	103.9	23.8	0.23	1.22	3.81	8.64	42.5	0.41	1.34	3.91	8.68
ECUADOR	28.4	6.9	0.24	0.91	3.94	6.21	14.6	0.51	1.23	4.22	6.42
FRENCH GUYANA	9.1	0.1	0.01	2.72	9.80	10.75	0.1	0.01	2.72	9.79	10.75
GUYANA	21.5	0.8	0.04	1.25	4.90	11.99	1.3	0.06	1.29	4.91	11.98
PARAGUAY	40.7	2.6	0.06	0.82	2.89	7.61	5.3	0.13	0.85	2.87	7.55
PERU	128.5	15.5	0.12	0.61	1.49	4.72	29.5	0.23	0.71	1.58	4.80
SURINAM	16.3	0.4	0.02	1.67	7.96	17.77	0.7	0.04	1.71	7.99	17.77
URUGUAY	17.8	2.8	0.16	1.04	3.07	7.54	3.4	0.19	1.06	3.08	7.53
VENEZUELA	88.2	12.7	0.14	0.89	2.72	8.40	25.7	0.29	1.00	2.81	8.45

LOCATION	TOTAL[1] LAND AREA (mill ha)	YEAR[2] 1975 POP (mill)	YEAR 1975 POP DENSITY	----- YEAR 1975 ----- POTENTIAL POPULATION SUPPORTING CAPACITY			YEAR[3] 2000 POP (mill)	YEAR 2000 POP DENSITY	----- YEAR 2000 ----- POTENTIAL POPULATION SUPPORTING CAPACITY		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS			LOW INPUTS	INTER INPUTS	HIGH INPUTS
CENTRAL AMERICA	271.6	106.6	0.39	0.64	1.65	4.51	215.2	0.79	1.07	2.04	4.76
ANTIGUA	0.0	0.1	1.66	0.66*	1.53*	5.13	0.1	1.93	0.65*	1.50*	5.06
BAHAMAS	1.0	0.2	0.20	0.26	3.18	11.90	0.3	0.33	0.26*	3.15	11.81
BARBADOS	0.0	0.2	5.70	0.49*	2.95*	6.83	0.3	6.91	0.45*	2.70*	6.25*
BELIZE	2.3	0.1	0.06	0.93	4.22	10.68	0.2	0.10	0.93	4.21	10.65
COSTA RICA	5.1	2.0	0.39	1.18	3.75	10.19	3.4	0.67	1.55	4.04	10.17
CUBA	11.5	9.3	0.82	0.98	1.82	6.99	12.7	1.11	2.47	3.16	7.41
DOMINICAN REP	4.8	5.2	1.08	1.23	2.77	5.71	9.3	1.93	1.84*	3.29	5.97
EL SALVADOR	2.1	4.1	1.97	0.96*	2.38	7.50	8.7	4.13	1.47*	2.66*	7.03
GUADELOUPE	0.2	0.3	1.83	0.72*	5.45	9.32	0.4	2.14	0.71*	5.35	9.15
GUATEMALA	10.8	6.2	0.58	0.72	2.07	7.10	12.7	1.18	1.05*	2.34	7.15
HAITI	2.8	5.2	1.86	0.95*	2.23	4.15	9.9	3.56	1.44*	2.55*	4.11
HONDURAS	11.2	3.1	0.28	0.82	2.05	6.61	7.0	0.62	0.93	2.14	6.60
JAMAICA	1.1	2.0	1.86	1.43*	3.87	8.45	2.9	2.62	2.00*	4.23	8.39
MARTINIQUE	0.1	0.3	2.95	0.76*	3.15	8.16	0.4	3.26	0.74*	3.09*	8.01
MEXICO	197.3	59.2	0.30	0.51	1.22	3.21	132.3	0.67	0.92	1.61	3.53
NETH. ANTILLES	0.1	0.2	2.51	<0.01*	0.01*	0.01*	0.4	4.05	<0.01*	0.01*	0.01*
NICARAGUA	12.1	2.3	0.19	1.23	3.52	9.86	5.2	0.43	1.41	3.65	9.78
PANAMA	7.6	1.7	0.22	1.16	3.91	9.79	2.8	0.37	1.23	3.92	9.75
PUERTO RICO	0.9	3.1	3.51	1.35*	3.40*	7.03	4.4	4.97	2.89*	4.63*	7.52
TRINIDAD & TOBAGO	0.5	1.1	2.11	1.05*	5.26	8.75	1.4	2.68	1.53*	5.54	8.75
WINDWARD IS.	0.2	0.4	1.81	1.05*	3.73	11.10	0.4	2.09	1.03*	3.67	10.91
SOUTHEAST ASIA	897.6	1117.7	1.25	1.39	3.76	6.34	1937.1	2.16	2.74	4.86	7.06
BANGLADESH	14.4	76.6	5.32	2.46*	6.98	11.17	153.3	10.65	8.38*	10.38*	12.86
BHUTAN	4.7	1.2	0.25	0.33	0.95	1.71	2.0	0.43	0.33*	0.94	1.69
BRUNEI	0.6	0.2	0.28	0.92	8.11	9.72	0.3	0.53	0.91	8.01	9.63
BURMA	67.7	31.2	0.46	0.84	2.67	5.32	55.1	0.81	0.97	2.73	5.25
SRI LANKA	6.6	13.6	2.07	1.72*	5.03	7.36	20.1	3.06	2.36*	5.22	7.19
INDIA	320.4	618.7	1.93	1.56*	3.53	6.84	1036.7	3.23	3.24	5.62	8.18
INDONESIA	191.9	135.9	0.71	1.49	5.13	7.51	221.0	1.15	1.82	5.35	7.66
KAMPUCHEA	17.7	8.1	0.46	1.10	4.29	8.88	13.4	0.76	1.16	4.29	8.79
LAO	23.7	3.3	0.14	0.35	1.18	3.11	5.7	0.24	0.38	1.19	3.09
MALAYSIA	32.9	12.0	0.36	2.66	7.83	7.19	20.1	0.61	2.79	7.91	7.22
NEPAL	14.1	12.7	0.90	0.85*	2.39	3.67	22.4	1.59	1.67	2.82	3.92
PAKISTAN	88.7	70.3	0.79	0.90	0.98	1.08	145.0	1.63	2.60	2.66	2.74
PHILIPPINES	30.0	43.8	1.46	1.58	5.55	8.91	83.4	2.78	2.42*	5.96	8.74
SINGAPORE	0.1	2.3	38.79	<0.01*	<0.01*	<0.01*	3.1	53.36	<0.01*	<0.01*	<0.01*
THAILAND	51.4	41.4	0.80	1.16	3.22	7.13	76.1	1.48	2.04	3.92	7.47
VIETNAM	33.0	46.5	1.41	1.28*	3.77	6.91	79.4	2.41	1.79*	4.07	7.03

1/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.

2/ U.N. data for 1975, millions of persons. U.N. 1979

3/ Projected U.N. data for 2000, millions of persons. Medium variant. U.N. 1979

* ASTERISK INDICATES POTENTIAL POPULATION SUPPORTING CAPACITY LESS THAN PRESENT AND/OR PROJECTED POPULATION.

Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

TABLE 3.5 PRESENT AND PROJECTED POPULATIONS AND RATIOS TO PRESENT AND PROJECTED POPULATION
SUPPORTING CAPACITIES BY LOCATION
AFRICA, SOUTHWEST ASIA, SOUTH AMERICA, CENTRAL AMERICA AND SOUTHEAST ASIA

LOCATION	LAND AREA (mill ha)[1]	YEAR 1975 POP (mill)[2]	YEAR 1975 POP DENSITY	----- YEAR 1975 ---- RATIOS			YEAR 2000 POP (mill)[3]	YEAR 2000 POP DENSITY	----- YEAR 2000 --- RATIOS		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS			LOW INPUTS	INTER INPUTS	HIGH INPUTS
AFRICA ******											
CAPE VERDE	0.4	0.3	0.74	<0.01*	<0.01*	0.02*	0.4	1.06	<0.01*	<0.01*	<0.01*
WESTN SAHARA	26.6	0.1	<0.01	<0.01*	<0.01*	<0.01*	0.2	<0.01	<0.01*	<0.01*	<0.01*
RWANDA	2.5	4.1	1.62	0.18*	0.88*	1.99	9.0	3.53	0.08*	0.38*	0.85*
TOTALS FOR CLASS 1	29.6	4.5	0.15	0.16*	0.80*	1.81	9.7	0.33	0.08*	0.36*	0.79*
BURUNDI	2.6	3.9	1.52	0.22*	1.17	2.66	7.8	3.03	0.10*	0.54*	1.23
NIGER	126.1	4.6	0.04	0.17*	0.56*	9.43	9.7	0.08	0.14*	0.32*	4.48
REUNION	0.3	0.5	1.92	0.20*	1.00*	3.33	0.7	2.73	0.14*	0.67*	2.23
KENYA	57.0	13.5	0.24	0.27*	0.90*	3.90	33.6	0.59	0.17*	0.40*	1.54
LESOTHO	3.0	1.2	0.39	0.46*	1.15	2.64	2.1	0.69	0.26*	0.65*	1.48
COMOROS	0.2	0.3	1.40	0.42*	1.78	3.48	0.4	2.07	0.27*	1.16	2.26
ALGERIA	237.8	15.7	0.07	0.45*	1.57	2.99	36.0	0.15	0.33*	0.79*	1.37
SOMALIA	63.6	3.2	0.05	0.40*	0.75*	2.18	6.3	0.10	0.34*	0.51*	1.23
ETHIOPIA	120.8	28.8	0.24	0.59*	2.38	10.73	55.3	0.46	0.36*	1.28	5.55
NIGERIA	91.2	65.7	0.72	0.82*	3.32	11.27	148.9	1.63	0.37*	1.39	4.71
NAMIBIA	82.3	0.9	<0.01	0.84*	2.40	36.56	1.7	0.02	0.43*	1.24	18.82
UGANDA	20.0	11.3	0.57	0.97*	3.88	13.60	24.6	1.23	0.45*	1.75	6.08
MAURITANIA	103.1	1.4	<0.01	0.35*	1.42	5.92	2.9	0.03	0.46*	0.97*	3.08
MAURITIUS	0.2	0.9	4.85	0.71*	1.27	1.01	1.3	7.09	0.47*	0.86*	0.79*
TOTALS FOR CLASS 2	908.1	151.8	0.17	0.65*	2.53	9.29	331.4	0.36	0.34*	1.15	4.12
UPPER VOLTA	27.1	6.1	0.22	0.90*	4.36	22.48	11.8	0.44	0.51*	2.26	11.45
MALAWI	8.8	5.2	0.59	1.27	4.63	10.88	11.9	1.35	0.61*	2.01	4.62
BOTSWANA	60.0	0.7	<0.01	1.27	6.67	64.61	1.4	0.02	0.63*	3.32	32.13
TUNISIA	16.3	5.6	0.34	0.45*	1.12	2.14	9.6	0.59	0.70*	1.06	1.62
MOROCCO	44.4	17.3	0.39	0.73*	1.55	2.69	36.1	0.81	0.78*	1.15	1.65
SENEGAL	19.6	5.0	0.25	0.89*	3.89	21.00	9.7	0.49	0.79*	2.31	10.33
TOGO	5.6	2.3	0.42	1.69	7.92	22.47	5.0	0.90	0.82*	3.65	10.76
SIERRA LEONE	7.2	3.0	0.42	1.69	9.14	16.43	6.1	0.84	0.89*	4.52	8.12
SWAZILAND	1.7	0.5	0.28	1.75	7.40	13.51	0.9	0.54	0.89*	3.77	6.88
MALI	124.0	5.8	0.05	1.34	6.04	29.44	11.6	0.09	0.90*	3.21	14.73
BENIN	11.3	3.0	0.27	2.08	9.34	33.60	6.5	0.58	0.95*	4.28	15.40
ZIMBABWE	38.6	6.2	0.16	1.65	7.80	29.88	14.0	0.36	0.95*	3.64	13.21
TOTALS FOR CLASS 3	364.5	60.9	0.17	1.10	4.44	15.96	124.7	0.34	0.78*	2.36	7.86
GHANA	22.6	10.0	0.44	2.04	8.86	24.40	21.2	0.94	1.03	4.19	11.25
TANZANIA	88.9	15.4	0.17	2.29	9.37	32.55	33.8	0.38	1.12	4.30	14.72
LIBYA	175.9	2.4	<0.01	0.74*	1.51	2.71	5.8	0.03	1.20	1.47	1.89
GAMBIA	1.1	0.5	0.46	1.49	6.44	21.47	1.0	0.90	1.21	3.63	11.10
EGYPT	99.1	36.9	0.37	1.67	1.67	1.67	64.7	0.65	1.74	1.74	1.74
CHAD	127.5	4.3	0.03	3.15	16.10	70.80	8.0	0.06	1.78	8.77	38.30
SAO TOME ETC	0.1	0.1	0.87	1.98	7.21	9.71	0.1	0.96	1.79	6.52	8.79
GUINEA	24.6	4.4	0.18	3.39	12.22	39.54	8.2	0.33	1.82	6.54	21.16
TOTALS FOR CLASS 4	539.8	74.1	0.14	2.00	5.75	17.64	142.8	0.26	1.47	3.39	9.47
MOZAMBIQUE	78.3	9.2	0.12	4.14	17.01	58.07	18.2	0.23	2.17	8.65	29.33
SUDAN	250.5	16.0	0.06	3.71	14.91	64.72	31.3	0.12	2.58	8.30	33.73
GUIN BISSAU	3.6	0.5	0.15	4.40	17.23	55.97	0.8	0.23	2.72	10.65	34.62
LIBERIA	11.1	1.6	0.14	6.03	30.35	80.52	3.5	0.31	2.77	13.62	36.14
IVORY COAST	31.5	6.7	0.21	7.15	24.56	55.57	13.9	0.44	3.41	11.65	26.38
MADAGASCAR	58.0	7.7	0.13	6.29	25.03	72.88	15.1	0.26	3.67	12.97	37.03
ANGOLA	123.9	6.2	0.05	8.57	45.01	150.14	11.8	0.09	4.51	23.52	78.98
ZAMBIA	74.3	4.8	0.06	10.17	44.88	159.38	10.4	0.14	4.68	20.63	73.31
TOTALS FOR CLASS 5	631.2	52.7	0.08	5.84	24.74	82.65	105.0	0.17	3.21	12.60	41.55
CAMEROON	47.2	7.5	0.16	10.25	27.93	81.81	13.0	0.28	5.89	16.03	46.92
ZAIRE	232.2	24.5	0.11	11.91	52.27	117.83	46.2	0.20	6.29	27.77	62.26
EQ GUINEA	2.8	0.3	0.12	12.08	35.65	104.44	0.6	0.20	6.93	20.44	59.87
TOTALS FOR CLASS 6	282.2	32.3	0.11	11.53	46.46	109.35	59.7	0.21	6.21	25.15	58.90
CENT AFR	62.3	2.0	0.03	22.59	106.68	301.12	3.6	0.06	12.45	58.97	165.94
CONGO	34.2	1.4	0.04	29.90	120.11	299.88	2.5	0.07	16.44	65.76	164.02
GABON	26.2	0.5	0.02	80.19	243.44	538.40	0.8	0.03	55.53	168.58	372.84
TOTALS FOR CLASS 7	122.7	3.9	0.03	32.93	129.86	332.73	6.8	0.06	18.65	73.52	188.07
AFRICA TOTALS	2878.1	380.2	0.13	2.95	11.55	33.85	780.1	0.27	1.61	5.75	16.50

1/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.

2/ U.N. data for 1975, millions of persons. U.N. 1979a.

3/ Projected U.N. data for 2000, millions of persons. Medium variant. U.N. 1979a.

* ASTERISK INDICATES POTENTIAL POPULATION SUPPORTING CAPACITY LESS THAN PRESENT AND?OR PROJECTED POPULATION

Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

THIS TABLE HAS BEEN SORTED ACCORDING TO INCREASING RATIOS, BY COUNTRY, RELATED TO LOW INPUT YEAR 2000 RATIOS

TABLE 3.5 contd.

LOCATION	LAND AREA (mill ha) [1]	YEAR 1975 POP (mill) [2]	YEAR 1975 POP DENSITY	YEAR 1975 RATIOS			YEAR 2000 POP (mill) [3]	YEAR 2000 POP DENSITY	YEAR 2000 RATIOS		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS			LOW INPUTS	INTER INPUTS	HIGH INPUTS
SOUTHWEST ASIA **************											
BAHRAIN	0.1	0.3	4.27	<0.01*	<0.01*	<0.01*	0.5	8.97	<0.01*	<0.01*	<0.01*
QATAR	2.2	0.2	0.08	<0.01*	<0.01*	<0.01*	0.4	0.20	<0.01*	<0.01*	<0.01*
OMAN	21.3	0.8	0.04	<0.01*	<0.01*	<0.01*	1.6	0.08	<0.01*	<0.01*	<0.01*
KUWAIT	1.6	1.0	0.63	<0.01*	0.01*	0.01*	3.2	1.98	<0.01*	<0.01*	<0.01*
UNITED ARAB EMIRATES	8.4	0.6	0.07	0.18*	0.18*	0.18*	1.6	0.20	0.08*	0.08*	0.08*
TOTALS FOR CLASS : 1	33.5	2.8	0.08	0.04*	0.04*	0.04*	7.4	0.22	0.02*	0.02*	0.02*
JORDAN	9.8	2.7	0.28	0.24*	0.42*	0.52*	5.9	0.60	0.16*	0.23*	0.27*
SAUDI ARABIA	215.0	7.2	0.03	0.21*	0.27*	0.67*	15.6	0.07	0.17*	0.19*	0.38*
LEBANON	1.0	2.8	2.69	0.25*	0.42*	0.49*	4.9	4.70	0.23*	0.30*	0.33*
YEMEN DEM	28.2	1.6	0.06	0.58*	0.71*	1.17	3.4	0.12	0.30*	0.37*	0.58*
ISRAEL	2.1	3.4	1.67	0.38*	0.62*	0.89*	5.6	2.72	0.31*	0.41*	0.50*
YEMEN ARAB REP	19.5	5.3	0.27	0.48*	0.69*	1.45	10.0	0.51	0.35*	0.47*	0.91*
IRAQ	43.5	11.0	0.25	0.82*	1.78	3.17	24.3	0.56	0.38*	0.74*	1.23
AFGHANISTAN	64.8	19.3	0.30	0.62*	0.77*	1.06	36.6	0.57	0.43*	0.51*	0.66*
TOTALS FOR CLASS : 2	383.7	53.4	0.14	0.54*	0.86*	1.42	106.2	0.28	0.34*	0.48*	0.72*
SYRIA	18.5	7.3	0.40	0.72*	1.75	2.66	16.3	0.88	0.61*	0.96*	1.33
IRAN	164.8	32.7	0.20	0.86*	1.16	1.65	65.4	0.40	0.63*	0.78*	1.02
TOTALS FOR CLASS : 3	183.3	40.1	0.22	0.84*	1.27	1.84	81.7	0.45	0.63*	0.81*	1.08
TURKEY	76.9	40.1	0.52	1.12	1.91	2.96	69.4	0.90	1.34	1.75	2.29
TOTALS FOR CLASS : 4	76.9	40.1	0.52	1.12	1.91	2.96	69.4	0.90	1.34	1.75	2.30
SOUTHWEST ASIA TOTALS	677.4	136.3	0.20	0.79*	1.27	1.96	264.7	0.39	0.68*	0.90*	1.23
SOUTH AMERICA *************											
CHILE	75.7	10.2	0.13	1.28	2.50	4.38	14.9	0.20	1.75	2.58	3.83
TOTALS FOR CLASS : 4	75.7	10.2	0.13	1.28	2.51	4.39	14.9	0.20	1.75	2.57	3.82
ECUADOR	28.4	6.9	0.24	3.76	16.20	25.54	14.6	0.51	2.39	8.20	12.47
BRAZIL	851.3	109.7	0.13	5.45	27.06	65.02	212.5	0.25	2.93	14.01	33.44
PERU	128.5	15.5	0.12	5.06	12.32	39.00	29.5	0.23	3.10	6.91	20.98
COLOMBIA	103.9	23.8	0.23	5.30	16.58	37.59	42.5	0.41	3.27	9.57	21.22
VENEZUELA	88.2	12.6	0.14	6.22	19.01	58.74	25.7	0.29	3.45	9.67	29.03
ARGENTINA	278.9	25.4	0.09	5.72	16.75	36.41	32.8	0.12	4.95	13.28	28.49
TOTALS FOR CLASS : 5	1479.2	194.0	0.13	5.43	22.35	54.06	357.5	0.24	3.19	12.30	29.37
URUGUAY	17.8	2.8	0.16	6.51	19.17	47.10	3.4	0.19	5.47	15.87	38.80
PARAGUAY	40.7	2.6	0.06	12.69	44.43	117.03	5.3	0.13	6.51	22.08	58.11
BOLIVIA	109.9	4.9	0.04	15.58	61.22	146.93	9.3	0.08	8.45	32.58	77.86
TOTALS FOR CLASS : 6	168.3	10.4	0.06	12.44	45.73	112.71	18.0	0.11	7.33	26.37	64.76
GUYANA	21.5	0.8	0.04	33.84	132.57	324.11	1.3	0.06	22.33	84.65	206.48
SURINAM	16.3	0.4	0.02	76.00	362.04	807.54	0.7	0.04	39.72	185.79	413.26
FRENCH GUYANA	9.1	0.1	0.01	388.29	999.00	999.00	0.1	0.01	209.00	753.38	826.77
TOTALS FOR CLASS : 7	46.9	1.2	0.03	65.25	247.24	505.44	2.1	0.04	38.68	156.32	310.32
SOUTH AMERICA TOTALS	1770.2	215.8	0.12	5.91	23.92	57.22	392.6	0.22	3.51	13.34	31.51

1/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.

2/ U.N. data for 1975, millions of persons. U.N. 1979 ..

3/ Projected U.N. data for 2000, millions of persons. Medium variant. U.N. 1979 .

* ASTERISK INDICATES POTENTIAL POPULATION SUPPORTING CAPACITY LESS THAN PRESENT AND?OR PROJECTED POPULATION.

Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

THIS TABLE HAS BEEN SORTED ACCORDING TO INCREASING RATIOS, BY COUNTRY, RELATED TO LOW INPUT YEAR 2000 RATIOS

TABLE 3.5 contd.

LOCATION	LAND AREA (mill ha)[1]	YEAR 1975 POP (mill)[2]	YEAR 1975 POP DENSITY	----- YEAR 1975 ---- RATIOS			YEAR 2000 POP (mill)[3]	YEAR 2000 POP DENSITY	----- YEAR 2000 --- RATIOS		
				LOW INPUTS	INTER INPUTS	HIGH INPUTS			LOW INPUTS	INTER INPUTS	HIGH INPUTS
CENTRAL AMERICA ***************											
NETH. ANTILLES	0.1	0.2	2.51	<0.01*	<0.01*	<0.01*	0.4	4.05	<0.01*	<0.01*	<0.01*
BARBADOS	0.0	0.2	6.70	0.09*	0.52*	1.20	0.3	6.91	0.06*	0.39*	0.90*
TOTALS FOR CLASS : 1	0.1	0.5	3.43	0.04*	0.25*	0.57*	0.7	4.93	0.03*	0.16*	0.36*
MARTINIQUE	0.1	0.3	2.95	0.26*	1.07	2.76	0.4	3.26	0.23*	0.95*	2.45
GUADELOUPE	0.2	0.3	1.83	0.39*	2.98	5.10	0.4	2.14	0.33*	2.50	4.28
ANTIGUA	0.0	0.1	1.66	0.40*	0.92*	3.09	0.1	1.93	0.34*	0.78*	2.62
EL SALVADOR	2.1	4.1	1.97	0.49*	1.21	3.81	8.7	4.13	0.35*	0.64*	1.70
HAITI	2.8	5.2	1.86	0.51*	1.20	2.23	9.9	3.56	0.40*	0.72*	1.16
WINDWARD IS.	0.2	0.4	1.81	0.58*	2.06	6.11	0.4	2.09	0.49*	1.75	5.21
TOTALS FOR CLASS : 2	5.4	10.4	1.92	0.49*	1.28	3.12	19.8	3.67	0.38*	0.75*	1.57
TRINIDAD & TOBAGO	0.5	1.1	2.11	0.50*	2.49	4.15	1.4	2.68	0.57*	2.06	3.26
PUERTO RICO	0.9	3.1	3.51	0.39*	0.97*	2.00	4.4	4.97	0.58*	0.93*	1.51
JAMAICA	1.1	2.0	1.86	0.77*	2.08	4.54	2.9	2.62	0.76*	1.61	3.21
BAHAMAS	1.0	0.2	0.20	1.29	15.73	58.91	0.3	0.33	0.79*	9.62	36.02
GUATEMALA	10.8	6.2	0.58	1.25	3.58	12.26	12.7	1.18	0.89*	1.98	6.05
DOMINICAN REP	4.8	5.2	1.08	1.14	2.56	5.28	9.3	1.93	0.95*	1.70	3.09
TOTALS FOR CLASS : 3	19.1	17.9	0.94	0.97*	2.73	7.61	31.1	1.62	0.84*	1.80	4.45
MEXICO	197.3	59.2	0.30	1.69	4.08	10.71	132.3	0.67	1.38	2.40	5.26
HONDURAS	11.2	3.1	0.28	2.97	7.41	23.86	7.0	0.62	1.48	3.43	10.58
TOTALS FOR CLASS : 4	208.5	62.3	0.30	1.75	4.25	11.35	139.3	0.67	1.38	2.45	5.53
CUBA	11.4	9.3	0.82	1.20	2.23	8.57	12.7	1.11	2.22	2.85	6.67
COSTA RICA	5.1	2.0	0.39	3.05	9.65	26.26	3.4	0.67	2.32	6.06	15.27
PANAMA	7.6	1.7	0.22	5.24	17.71	44.30	2.8	0.37	3.30	10.54	26.21
NICARAGUA	12.1	2.3	0.19	6.38	18.33	51.33	5.2	0.43	3.30	8.55	22.89
TOTALS FOR CLASS : 5	36.2	15.3	0.42	2.67	7.33	21.27	24.1	0.66	2.60	5.43	13.66
BELIZE	2.3	0.1	0.06	15.28	69.20	175.05	0.2	0.10	9.03	40.89	103.45
TOTALS FOR CLASS : 6	2.3	0.1	0.06	15.18	68.74	173.90	0.2	0.10	9.22	41.75	105.62
CENTRAL AMERICA TOTALS	271.6	106.5	0.39	1.64	4.21	11.51	215.2	0.79	1.35	2.57	6.01
SOUTHEAST ASIA **************											
SINGAPORE	0.1	2.3	38.79	<0.01*	<0.01*	<0.01*	3.1	53.36	<0.01*	<0.01*	<0.01*
TOTALS FOR CLASS : 1	0.1	2.3	37.50	<0.01*	0.01*	<0.01*	3.1	51.50	<0.01*	0.01*	<0.01*
VIETNAM	33.0	46.5	1.41	0.90*	2.67	4.90	79.3	2.41	0.74*	1.69	2.92
BHUTAN	4.7	1.2	0.25	1.34	3.83	6.92	2.0	0.43	0.76*	2.16	3.91
SRI LANKA	6.6	13.6	2.07	0.83*	2.42	3.55	20.1	3.06	0.77*	1.71	2.35
BANGLADESH	14.4	76.6	5.32	0.46*	1.31	2.10	153.3	10.65	0.79*	0.97*	1.21
PHILIPPINES	30.0	43.8	1.46	1.08	3.80	6.10	83.4	2.78	0.87*	2.14	3.14
TOTALS FOR CLASS : 3	88.6	181.7	2.05	0.76*	2.36	3.92	338.2	3.82	0.80*	1.48	2.17
INDIA	320.4	618.7	1.93	0.81*	1.83	3.54	1036.7	3.23	1.00	1.74	2.53
NEPAL	14.1	12.7	0.90	0.94*	2.65	4.06	22.4	1.59	1.05	1.77	2.46
BURMA	67.6	31.2	0.46	1.82	5.78	11.52	55.1	0.81	1.19	3.35	6.44
THAILAND	51.4	41.4	0.80	1.44	4.00	8.86	76.1	1.48	1.38	2.65	5.05
KAMPUCHEA	17.6	8.1	0.46	2.39	9.35	19.35	13.4	0.76	1.52	5.66	11.58
LAO	23.7	3.3	0.14	2.54	8.41	22.19	5.7	0.24	1.58	4.91	12.79
INDONESIA	191.9	135.9	0.71	2.10	7.25	10.60	221.0	1.15	1.58	4.65	6.65
PAKISTAN	88.7	70.3	0.79	1.14	1.24	1.37	145.0	1.63	1.59	1.63	1.68
BRUNEI	0.6	0.2	0.28	3.26	28.85	34.60	0.3	0.53	1.71	15.11	18.16
TOTALS FOR CLASS : 4	776.1	921.8	1.19	1.11	2.92	5.14	1575.6	2.03	1.17	2.28	3.40
MALAYSIA	32.8	11.9	0.36	7.30	21.50	19.75	20.1	0.61	4.56	12.91	11.79
TOTALS FOR CLASS : 5	32.8	11.9	0.36	7.31	21.52	19.76	20.1	0.61	4.56	12.91	11.79
SOUTHEAST ASIA TOTALS	897.6	1117.7	1.25	1.12	3.02	5.09	1937.1	2.16	1.14	2.25	3.27
FIVE REGIONS TOTAL **************	6494.9	1956.6	0.30	2.03	6.94	16.56	3589.7	0.55	1.56	4.16	9.25

1/ Land areas derived from FAO/Unesco Soil Map and exclude areas mapped as water bodies.

2/ U.N. data for 1975, millions of persons. U.N. 1979

3/ Projected U.N. data for 2000, millions of persons. Medium variant. U.N. 1979

* ASTERISK INDICATES POTENTIAL POPULATION SUPPORTING CAPACITY LESS THAN PRESENT AND/OR PROJECTED POPULATION.

Original data to three decimal places. Apparent discrepancies in some totals due to rounding off.

THIS TABLE HAS BEEN SORTED ACCORDING TO INCREASING RATIOS, BY COUNTRY,
RELATED TO LOW INPUT YEAR 2000 RATIOS

0 9 1986

M - 04
ISBN 92-5-101411-6

338.191724
P847

Edx

UNIVERSITY OF
ILLINOIS LIBRARY
AT URBANA-CHAMPAIGN
EDUCATION

M - 04
ISBN 92-5-101411-6

MAY 09 1986